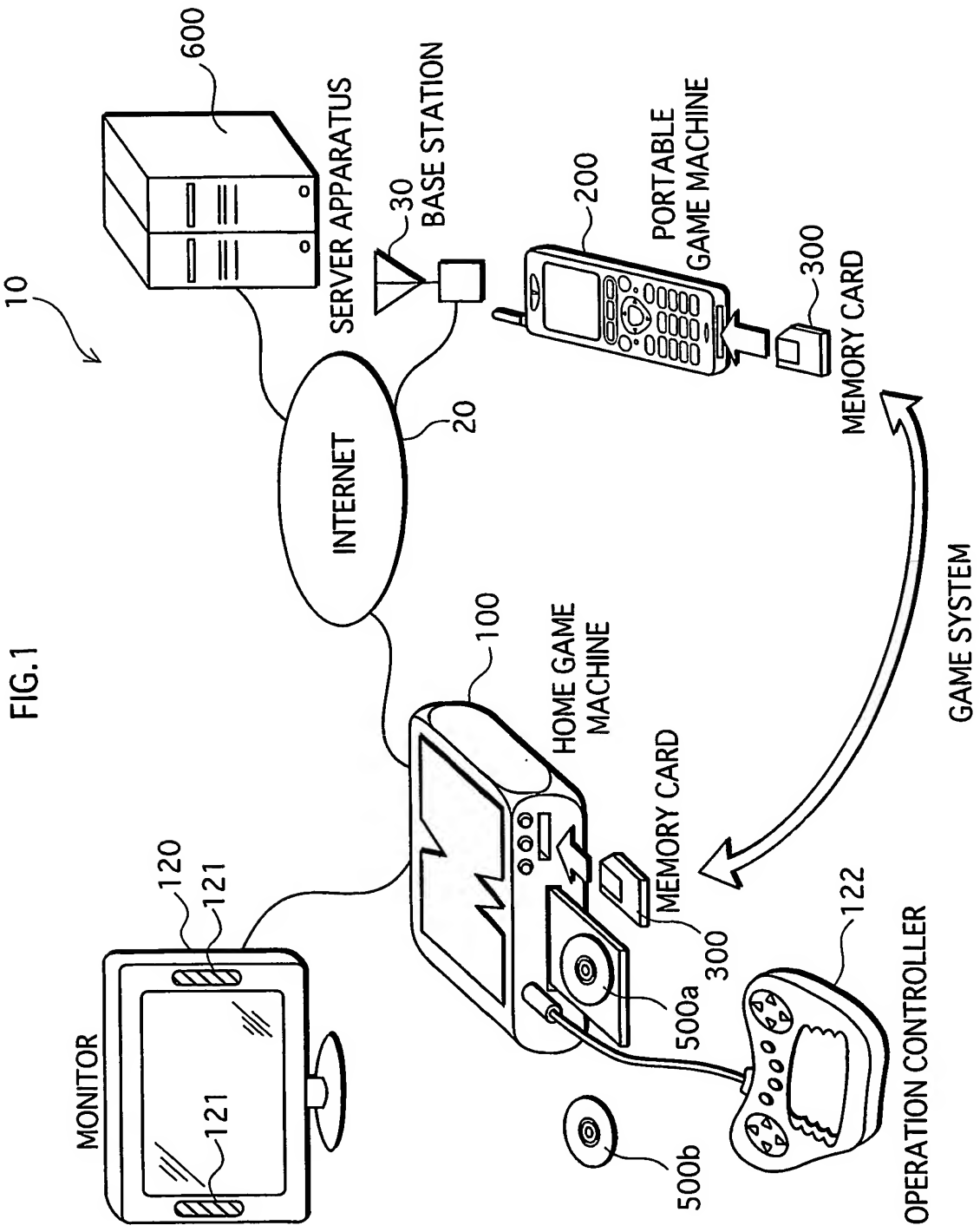

10
600
SERVER APPARATUS
30
BASE STATION
200
PORTABLE GAME MACHINE
300
MEMORY CARD
INTERNET
20
GAME SYSTEM
100
HOME GAME MACHINE
MEMORY CARD
300
120
121
MONITOR
121
500a
122
OPERATION CONTROLLER
500b

FIG.1

FIG.2

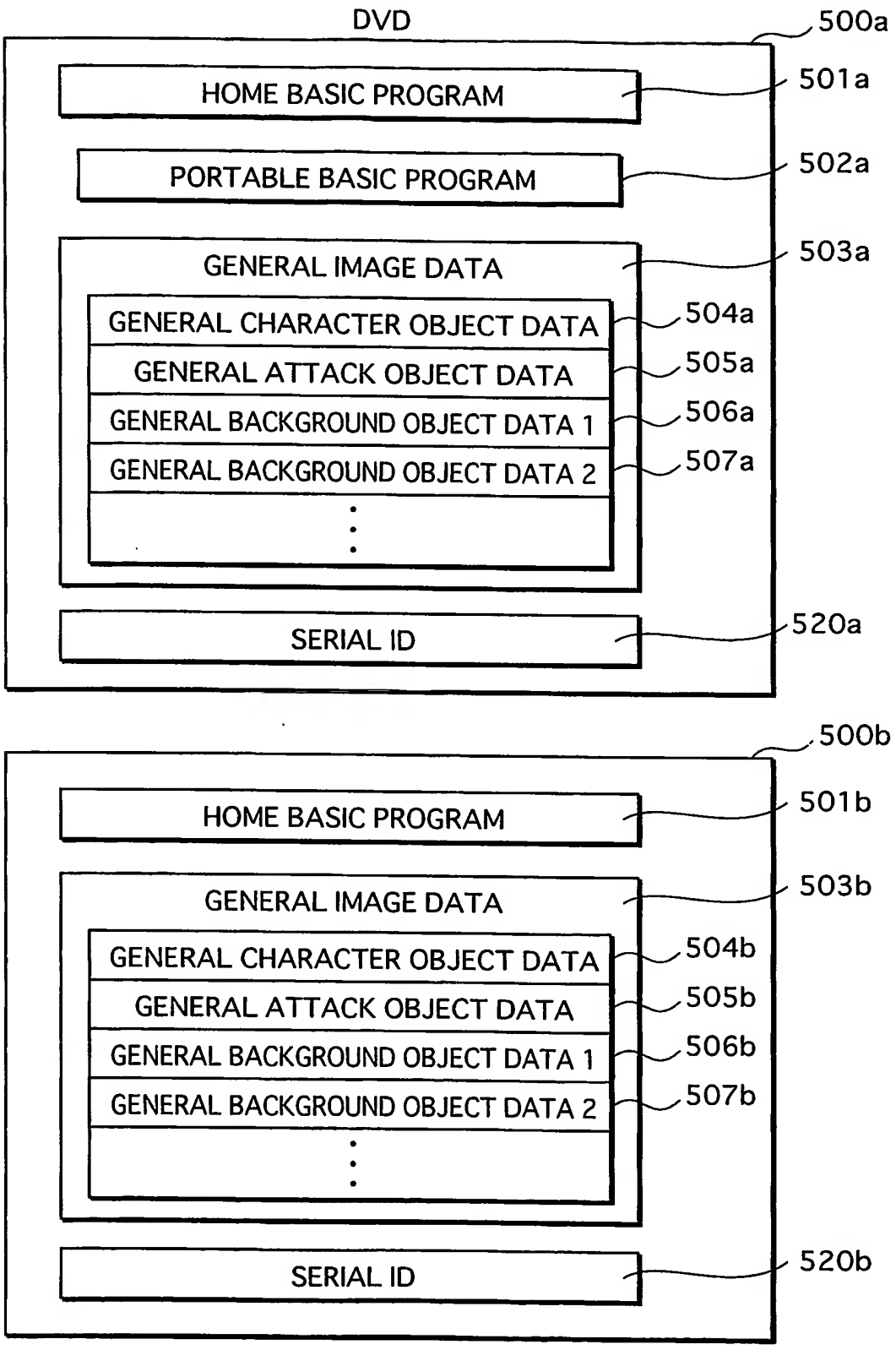

DVD
500a
HOME BASIC PROGRAM
501a
PORTABLE BASIC PROGRAM
502a
GENERAL IMAGE DATA
503a
GENERAL CHARACTER OBJECT DATA
504a
GENERAL ATTACK OBJECT DATA
505a
GENERAL BACKGROUND OBJECT DATA 1
506a
GENERAL BACKGROUND OBJECT DATA 2
507a
SERIAL ID
520a
500b
HOME BASIC PROGRAM
501b
GENERAL IMAGE DATA
503b
GENERAL CHARACTER OBJECT DATA
504b
GENERAL ATTACK OBJECT DATA
505b
GENERAL BACKGROUND OBJECT DATA 1
506b
GENERAL BACKGROUND OBJECT DATA 2
507b
SERIAL ID
520b

FIG.3

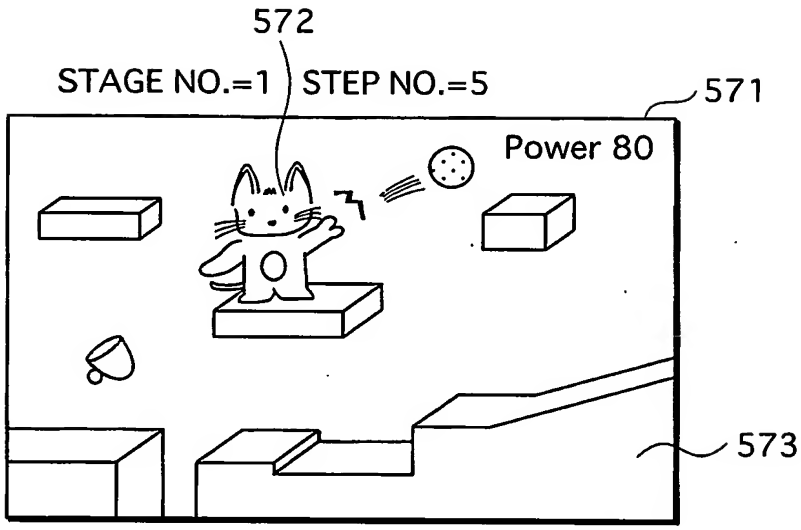


FIG.4

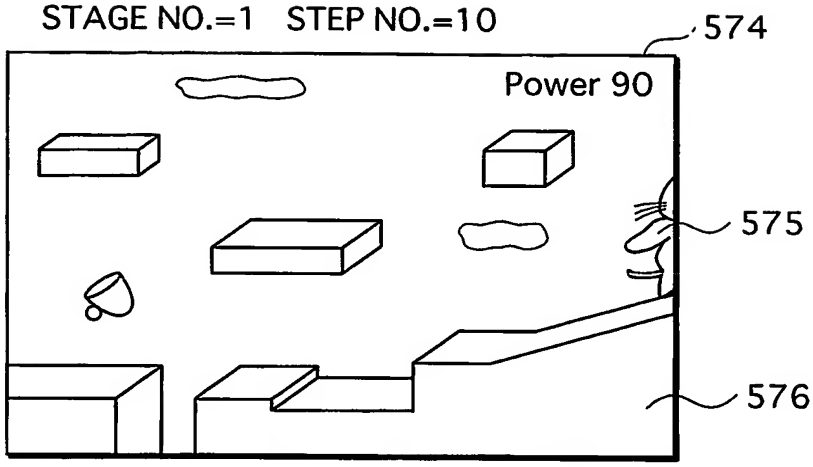


FIG.5

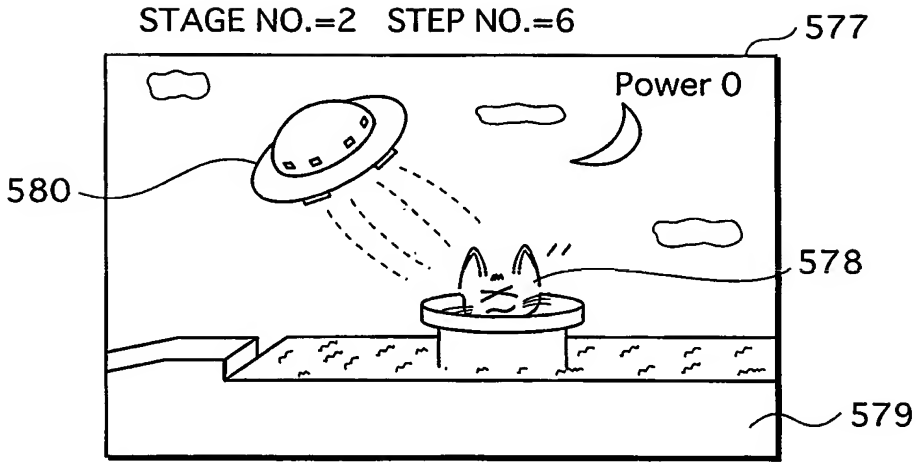


FIG.6

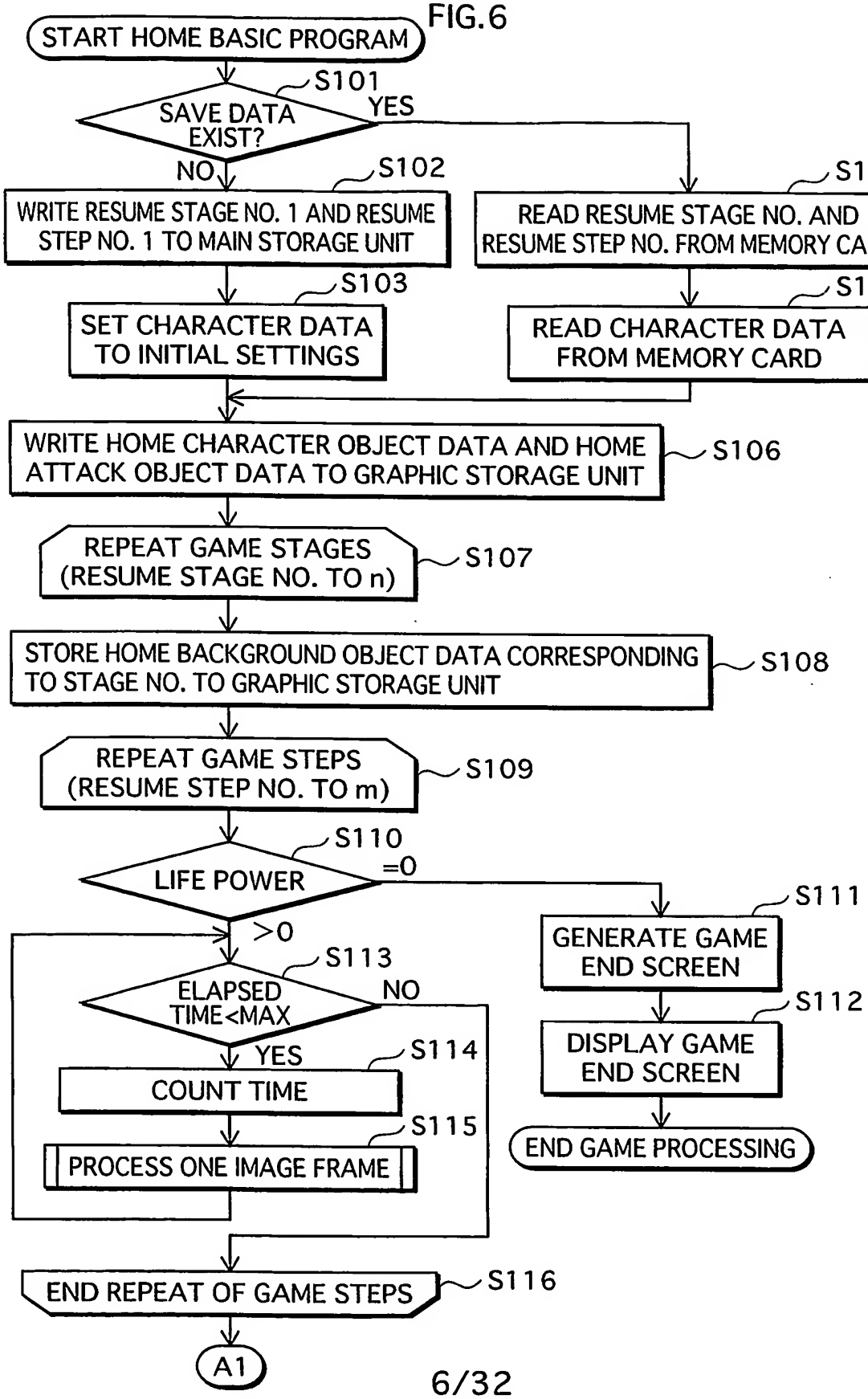

START HOME BASIC PROGRAM
S101
SAVE DATA EXIST?
YES
NO
S102
WRITE RESUME STAGE NO. 1 AND RESUME STEP NO. 1 TO MAIN STORAGE UNIT
S103
SET CHARACTER DATA TO INITIAL SETTINGS
S104
READ RESUME STAGE NO. AND RESUME STEP NO. FROM MEMORY CARD
S105
READ CHARACTER DATA FROM MEMORY CARD
WRITE HOME CHARACTER OBJECT DATA AND HOME ATTACK OBJECT DATA TO GRAPHIC STORAGE UNIT
S106
REPEAT GAME STAGES (RESUME STAGE NO. TO n)
S107
STORE HOME BACKGROUND OBJECT DATA CORRESPONDING TO STAGE NO. TO GRAPHIC STORAGE UNIT
S108
REPEAT GAME STEPS (RESUME STEP NO. TO m)
S109
S110
LIFE POWER
=0
>0
S111
GENERATE GAME END SCREEN
S112
DISPLAY GAME END SCREEN
END GAME PROCESSING
S113
ELAPSED TIME<MAX
NO
YES
S114
COUNT TIME
S115
PROCESS ONE IMAGE FRAME
END REPEAT OF GAME STEPS
S116
A1

FIG.7

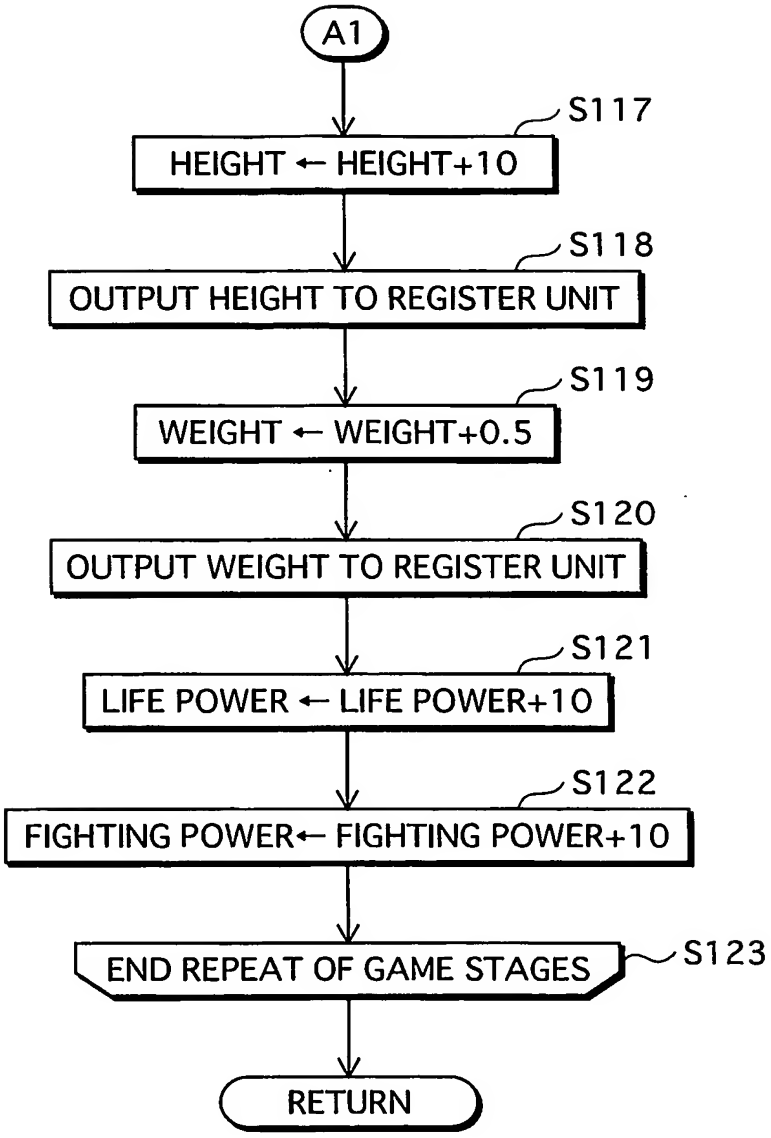

A1
S117
HEIGHT ← HEIGHT+10
S118
OUTPUT HEIGHT TO REGISTER UNIT
S119
WEIGHT ← WEIGHT+0.5
S120
OUTPUT WEIGHT TO REGISTER UNIT
S121
LIFE POWER ← LIFE POWER+10
S122
FIGHTING POWER← FIGHTING POWER+10
END REPEAT OF GAME STAGES
S123
RETURN

FIG.8

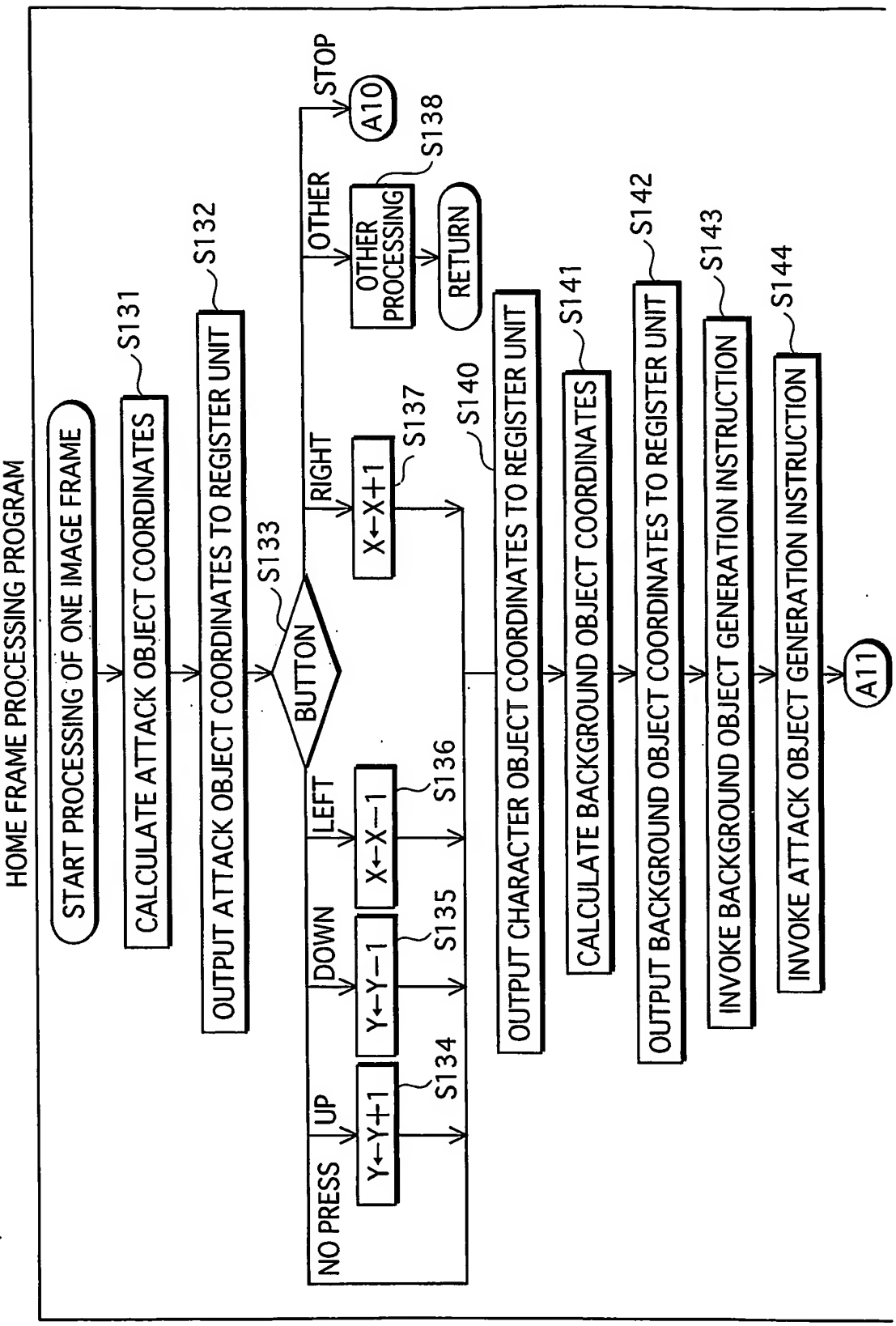

HOME FRAME PROCESSING PROGRAM
START PROCESSING OF ONE IMAGE FRAME
S131
CALCULATE ATTACK OBJECT COORDINATES
S132
OUTPUT ATTACK OBJECT COORDINATES TO REGISTER UNIT
S133
BUTTON
NO PRESS
UP
Y←Y+1
S134
DOWN
Y←Y−1
S135
LEFT
X←X−1
S136
RIGHT
X←X+1
S137
OTHER
OTHER PROCESSING
S138
RETURN
STOP
A10
S140
OUTPUT CHARACTER OBJECT COORDINATES TO REGISTER UNIT
S141
CALCULATE BACKGROUND OBJECT COORDINATES
S142
OUTPUT BACKGROUND OBJECT COORDINATES TO REGISTER UNIT
S143
INVOKE BACKGROUND OBJECT GENERATION INSTRUCTION
S144
INVOKE ATTACK OBJECT GENERATION INSTRUCTION
A11

FIG.9

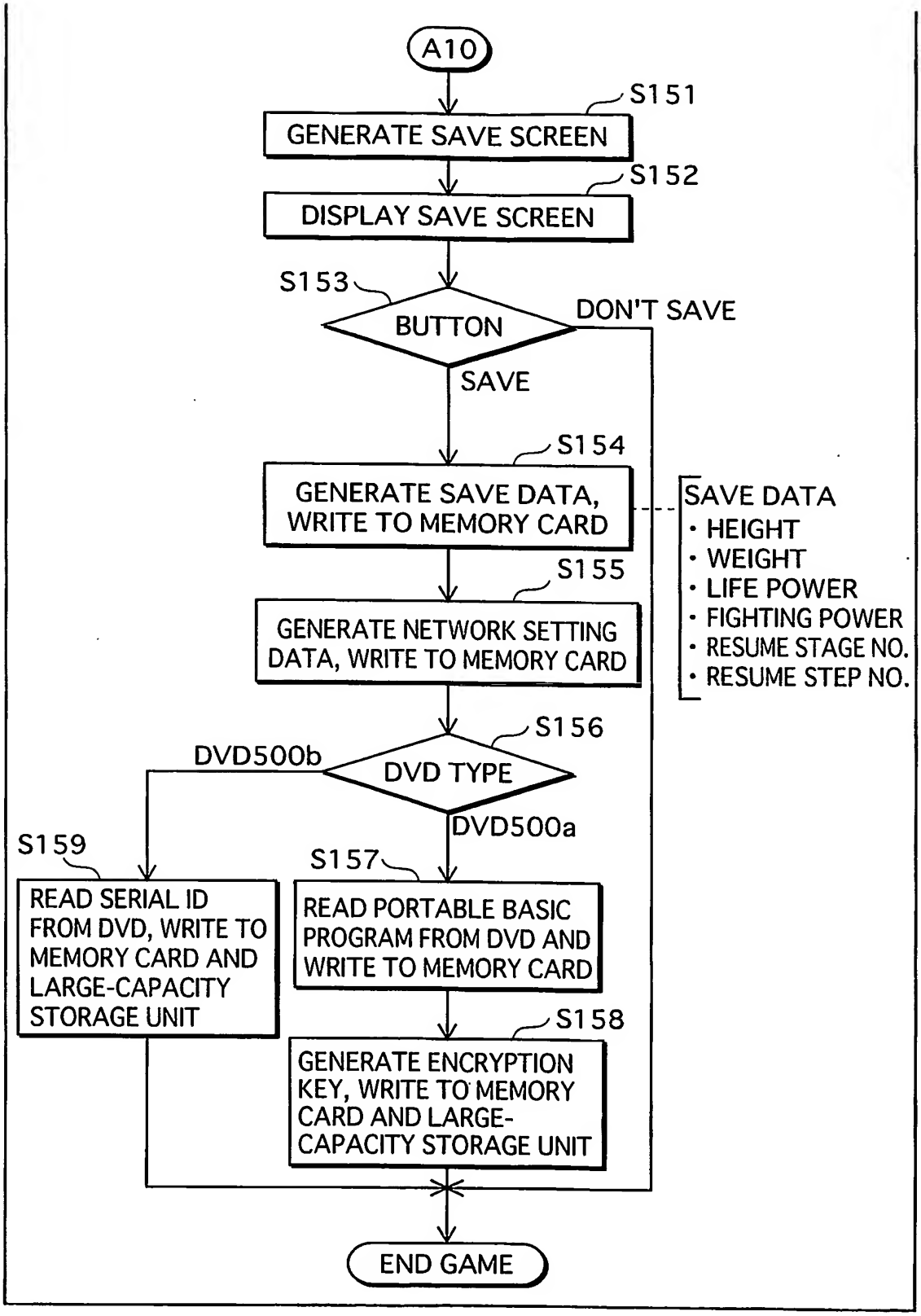

A10
S151
GENERATE SAVE SCREEN
S152
DISPLAY SAVE SCREEN
S153
BUTTON
DON'T SAVE
SAVE
S154
GENERATE SAVE DATA, WRITE TO MEMORY CARD
SAVE DATA
• HEIGHT
• WEIGHT
• LIFE POWER
• FIGHTING POWER
• RESUME STAGE NO.
• RESUME STEP NO.
S155
GENERATE NETWORK SETTING DATA, WRITE TO MEMORY CARD
S156
DVD TYPE
DVD500b
DVD500a
S159
READ SERIAL ID FROM DVD, WRITE TO MEMORY CARD AND LARGE-CAPACITY STORAGE UNIT
S157
READ PORTABLE BASIC PROGRAM FROM DVD AND WRITE TO MEMORY CARD
S158
GENERATE ENCRYPTION KEY, WRITE TO MEMORY CARD AND LARGE-CAPACITY STORAGE UNIT
END GAME

FIG.10

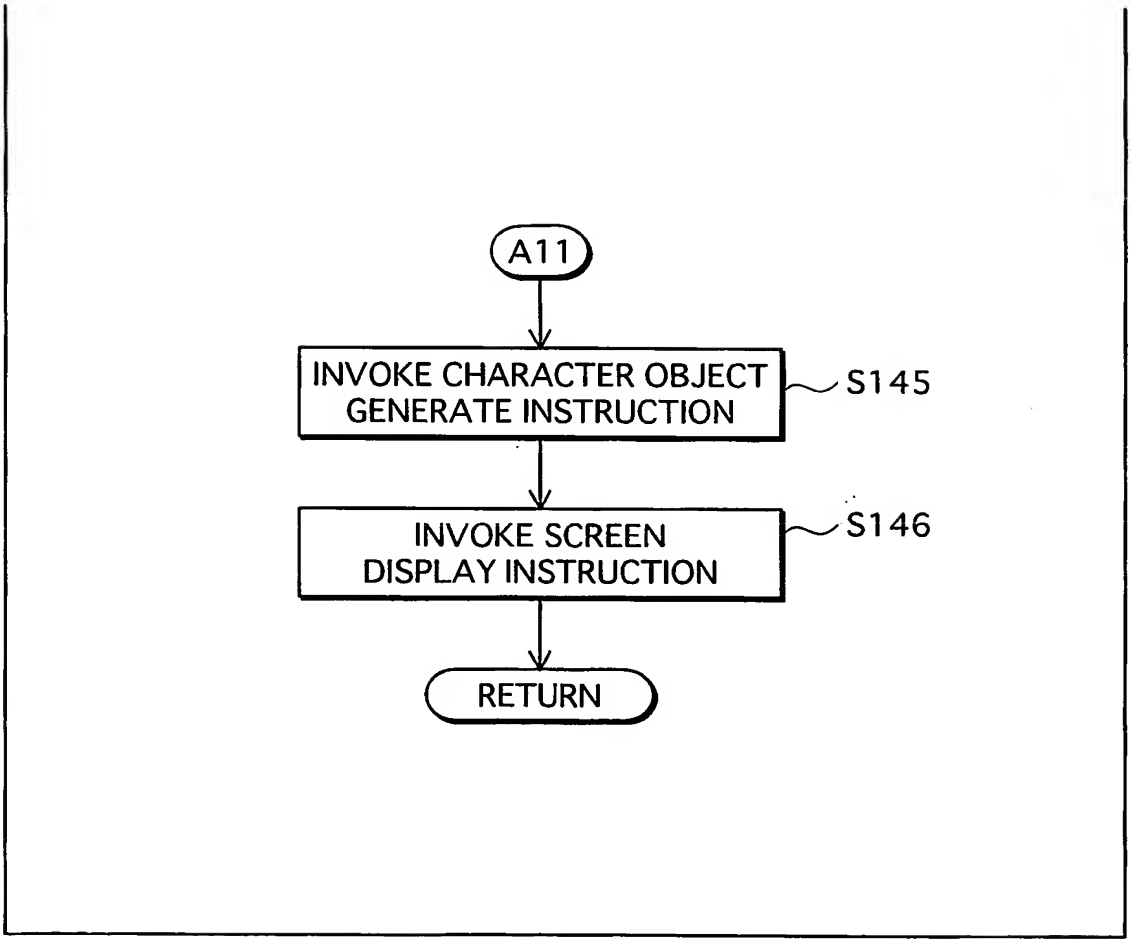

A11
INVOKE CHARACTER OBJECT GENERATE INSTRUCTION
S145
INVOKE SCREEN DISPLAY INSTRUCTION
S146
RETURN

FIG.11

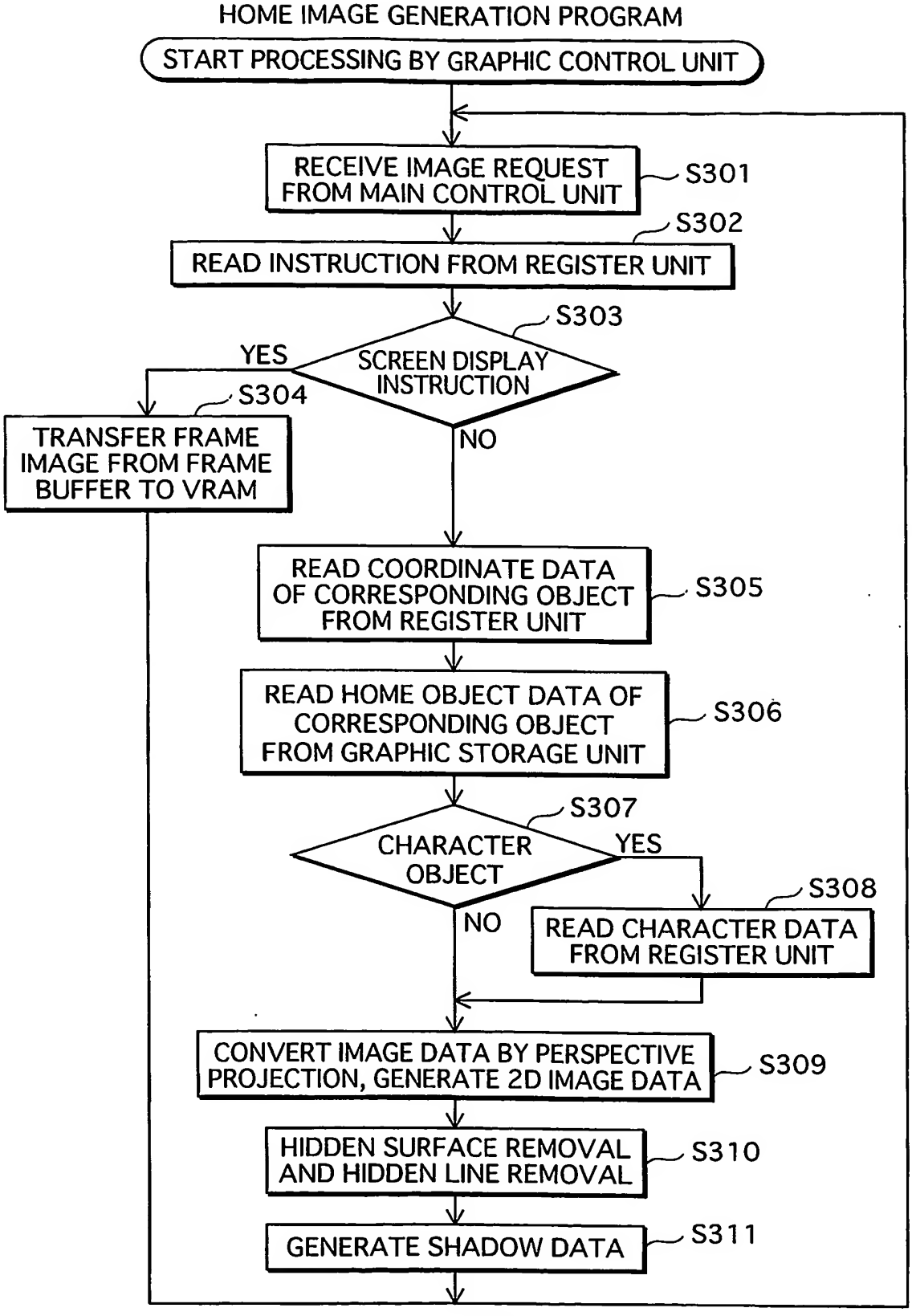

HOME IMAGE GENERATION PROGRAM
START PROCESSING BY GRAPHIC CONTROL UNIT
RECEIVE IMAGE REQUEST FROM MAIN CONTROL UNIT
S301
S302
READ INSTRUCTION FROM REGISTER UNIT
S303
SCREEN DISPLAY INSTRUCTION
YES
S304
TRANSFER FRAME IMAGE FROM FRAME BUFFER TO VRAM
NO
READ COORDINATE DATA OF CORRESPONDING OBJECT FROM REGISTER UNIT
S305
READ HOME OBJECT DATA OF CORRESPONDING OBJECT FROM GRAPHIC STORAGE UNIT
S306
S307
CHARACTER OBJECT
YES
S308
NO
READ CHARACTER DATA FROM REGISTER UNIT
CONVERT IMAGE DATA BY PERSPECTIVE PROJECTION, GENERATE 2D IMAGE DATA
S309
HIDDEN SURFACE REMOVAL AND HIDDEN LINE REMOVAL
S310
GENERATE SHADOW DATA
S311

FIG.12

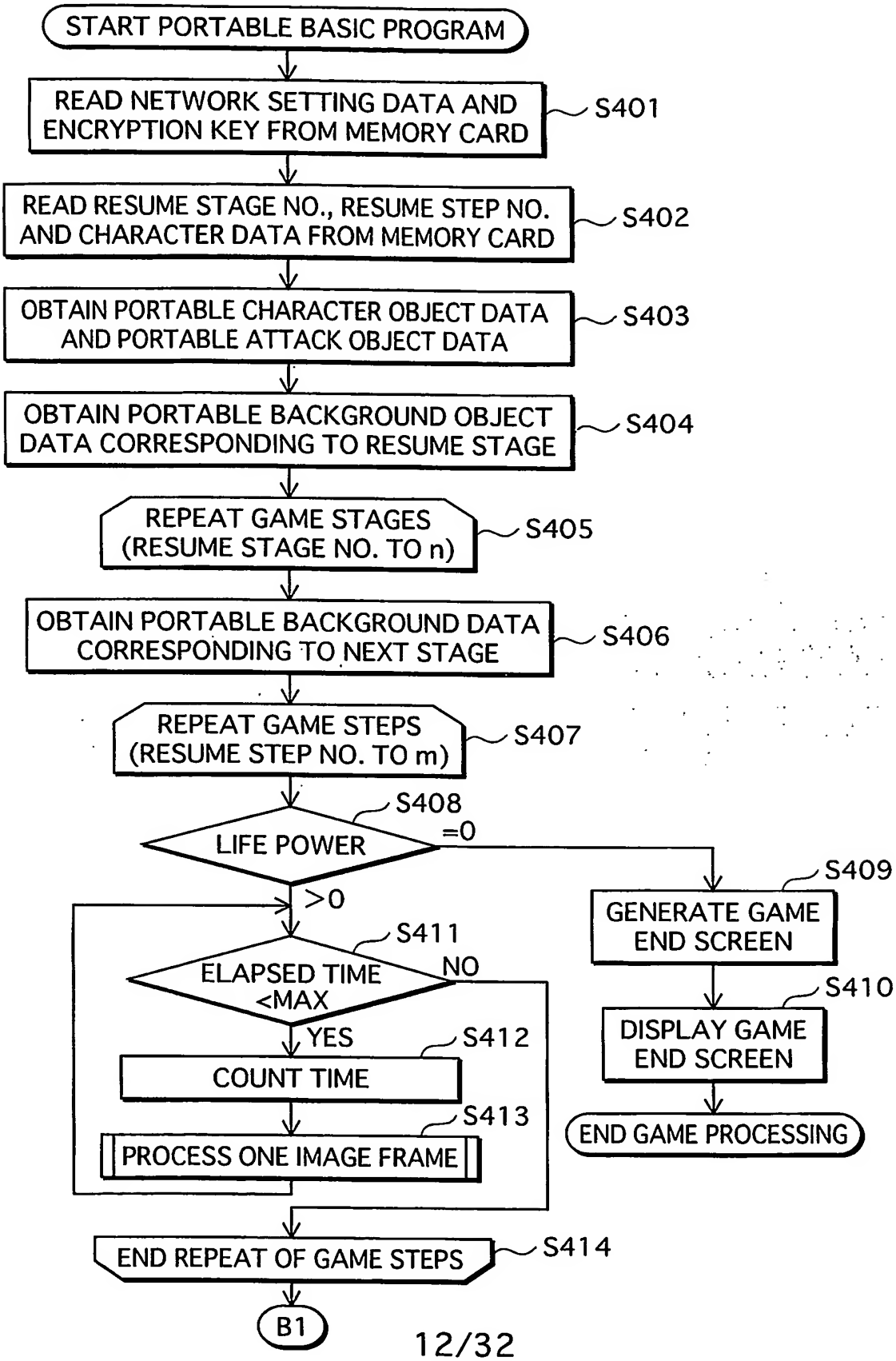

START PORTABLE BASIC PROGRAM
READ NETWORK SETTING DATA AND ENCRYPTION KEY FROM MEMORY CARD
S401
READ RESUME STAGE NO., RESUME STEP NO. AND CHARACTER DATA FROM MEMORY CARD
S402
OBTAIN PORTABLE CHARACTER OBJECT DATA AND PORTABLE ATTACK OBJECT DATA
S403
OBTAIN PORTABLE BACKGROUND OBJECT DATA CORRESPONDING TO RESUME STAGE
S404
REPEAT GAME STAGES (RESUME STAGE NO. TO n)
S405
OBTAIN PORTABLE BACKGROUND DATA CORRESPONDING TO NEXT STAGE
S406
REPEAT GAME STEPS (RESUME STEP NO. TO m)
S407
S408
LIFE POWER
=0
>0
S409
GENERATE GAME END SCREEN
S410
DISPLAY GAME END SCREEN
END GAME PROCESSING
S411
ELAPSED TIME <MAX
NO
YES
S412
COUNT TIME
S413
PROCESS ONE IMAGE FRAME
END REPEAT OF GAME STEPS
S414
B1

FIG.13

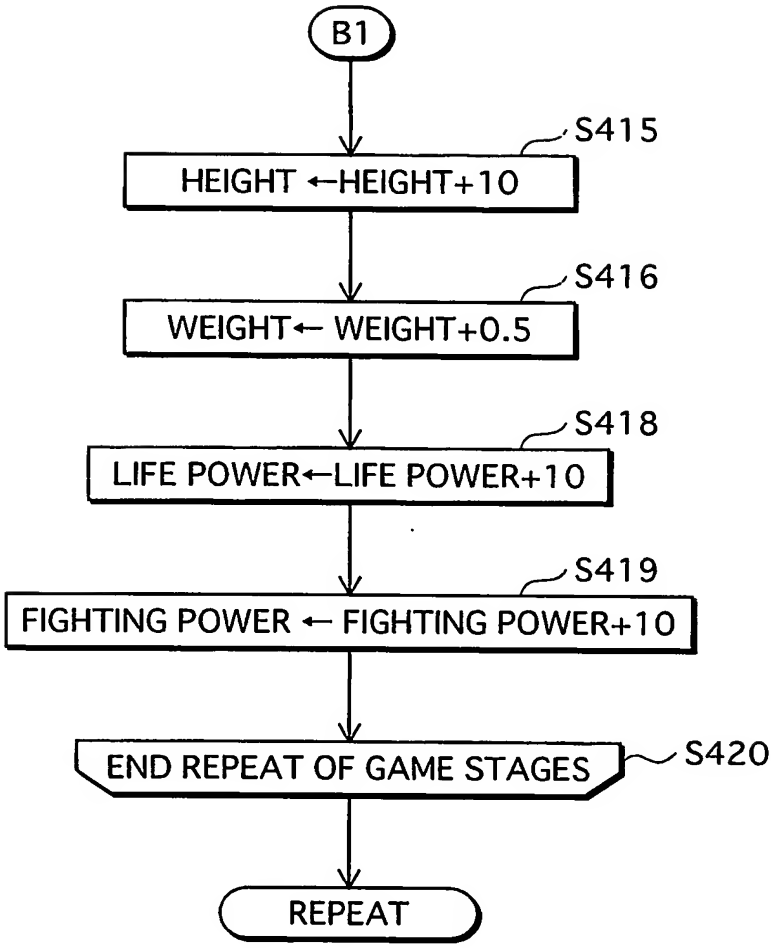

B1
S415
HEIGHT ←HEIGHT+10
S416
WEIGHT← WEIGHT+0.5
S418
LIFE POWER←LIFE POWER+10
S419
FIGHTING POWER ← FIGHTING POWER+10
END REPEAT OF GAME STAGES
S420
REPEAT

FIG.14

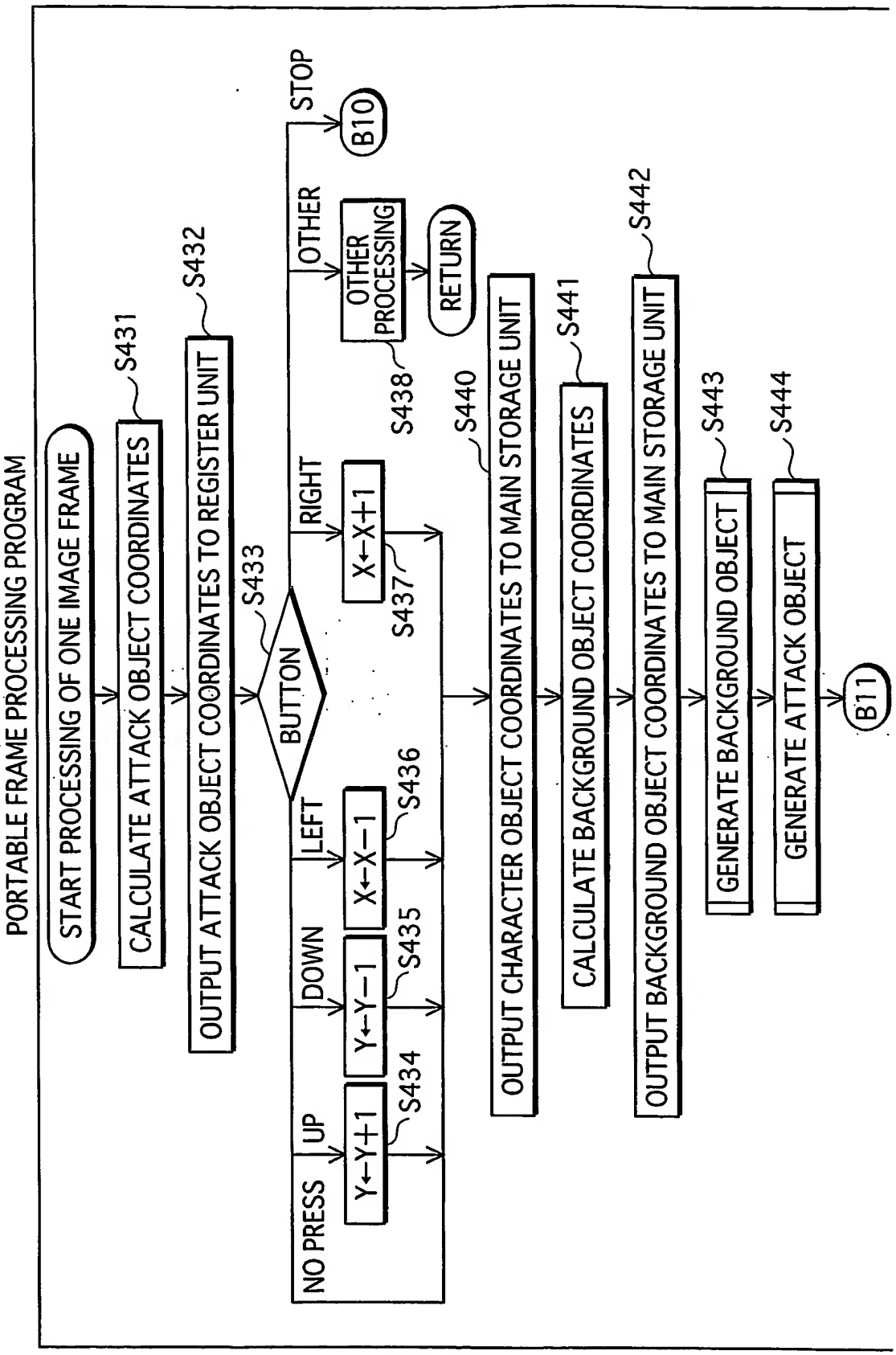

PORTABLE FRAME PROCESSING PROGRAM
START PROCESSING OF ONE IMAGE FRAME
S431
CALCULATE ATTACK OBJECT COORDINATES
S432
OUTPUT ATTACK OBJECT COORDINATES TO REGISTER UNIT
S433
BUTTON
STOP
B10
OTHER
OTHER PROCESSING
S438
RETURN
RIGHT
X←X+1
S437
LEFT
X←X−1
S436
DOWN
Y←Y−1
S435
UP
Y←Y+1
S434
NO PRESS
S440
OUTPUT CHARACTER OBJECT COORDINATES TO MAIN STORAGE UNIT
S441
CALCULATE BACKGROUND OBJECT COORDINATES
S442
OUTPUT BACKGROUND OBJECT COORDINATES TO MAIN STORAGE UNIT
S443
GENERATE BACKGROUND OBJECT
S444
GENERATE ATTACK OBJECT
B11

FIG.15

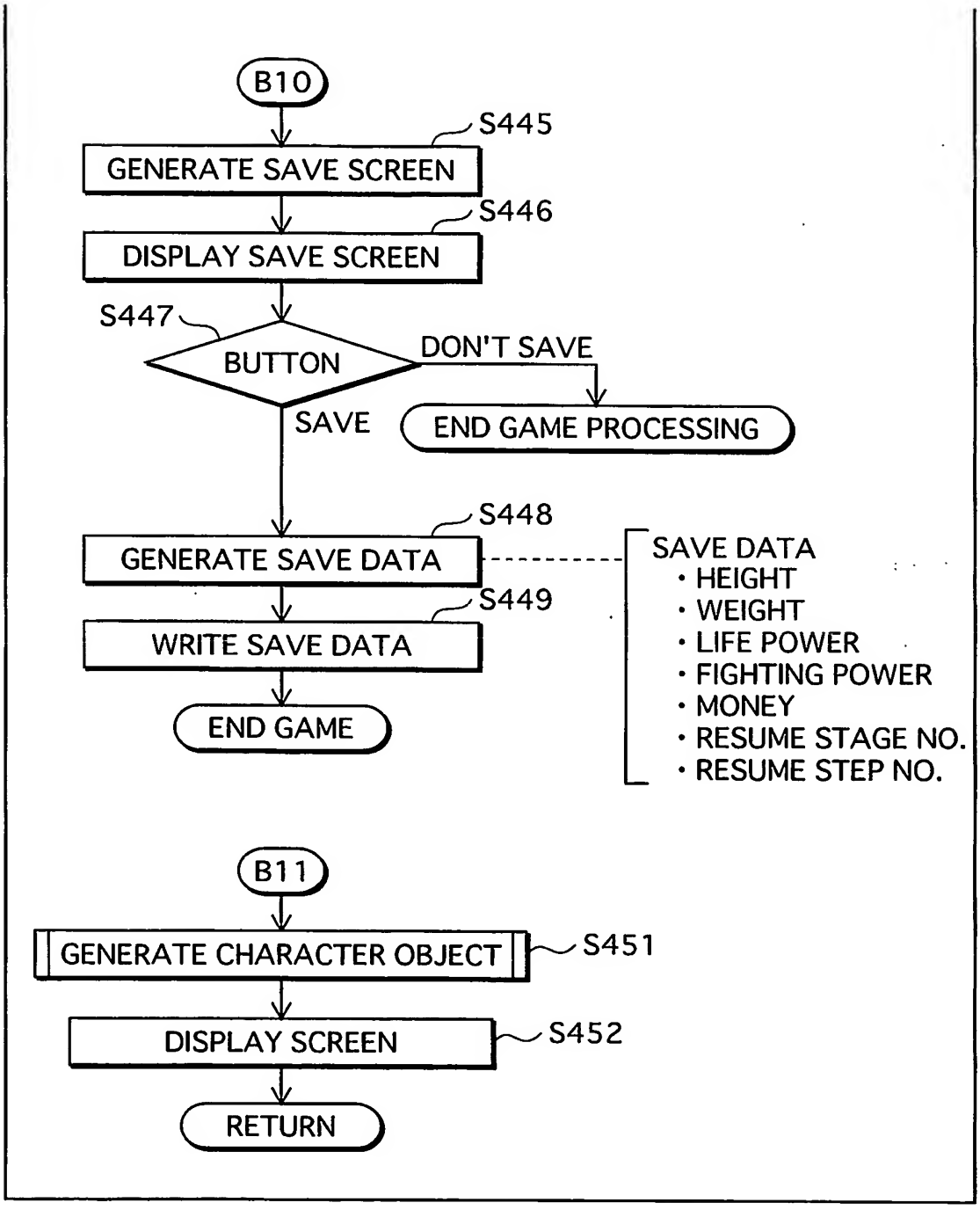

B10
S445
GENERATE SAVE SCREEN
S446
DISPLAY SAVE SCREEN
S447
BUTTON
DON'T SAVE
END GAME PROCESSING
SAVE
S448
GENERATE SAVE DATA
S449
WRITE SAVE DATA
END GAME
SAVE DATA
• HEIGHT
• WEIGHT
• LIFE POWER
• FIGHTING POWER
• MONEY
• RESUME STAGE NO.
• RESUME STEP NO.
B11
GENERATE CHARACTER OBJECT
S451
DISPLAY SCREEN
S452
RETURN

FIG.16

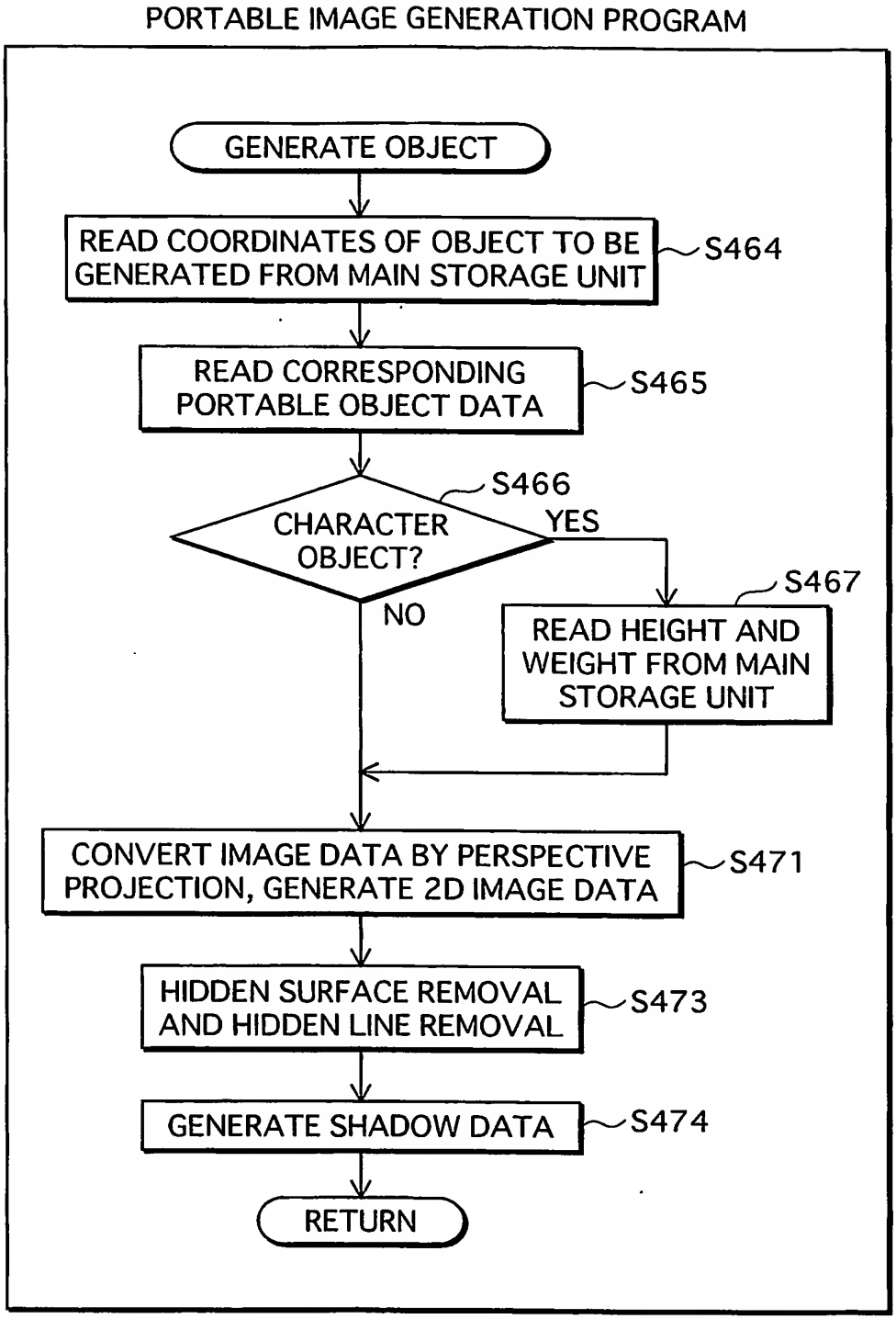

PORTABLE IMAGE GENERATION PROGRAM
GENERATE OBJECT
READ COORDINATES OF OBJECT TO BE GENERATED FROM MAIN STORAGE UNIT
S464
READ CORRESPONDING PORTABLE OBJECT DATA
S465
S466
CHARACTER OBJECT?
YES
NO
S467
READ HEIGHT AND WEIGHT FROM MAIN STORAGE UNIT
CONVERT IMAGE DATA BY PERSPECTIVE PROJECTION, GENERATE 2D IMAGE DATA
S471
HIDDEN SURFACE REMOVAL AND HIDDEN LINE REMOVAL
S473
GENERATE SHADOW DATA
S474
RETURN

FIG.17

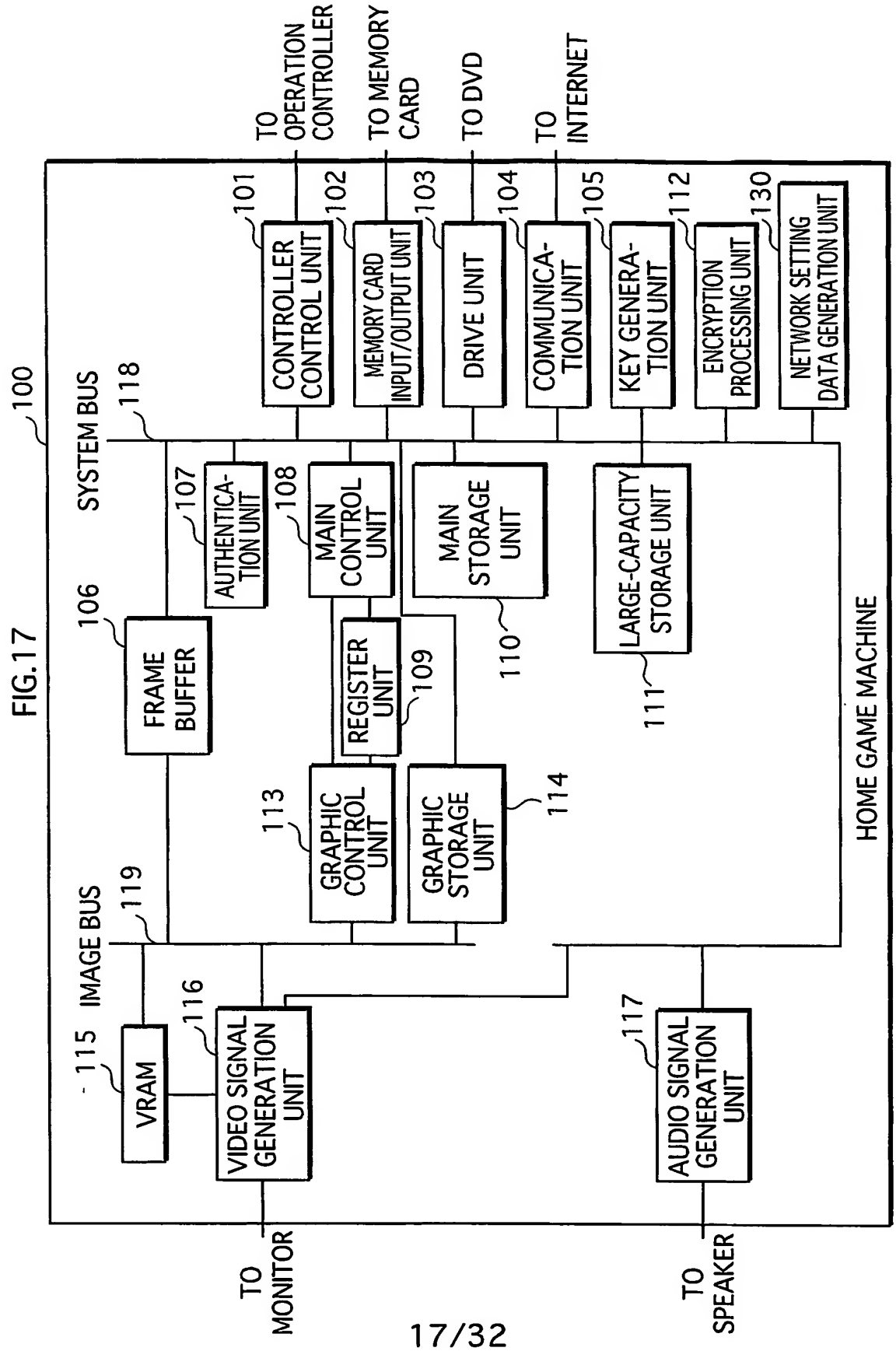

100
HOME GAME MACHINE
SYSTEM BUS
118
IMAGE BUS
119
CONTROLLER CONTROL UNIT
101
MEMORY CARD INPUT/OUTPUT UNIT
102
DRIVE UNIT
103
COMMUNICATION UNIT
104
KEY GENERATION UNIT
105
ENCRYPTION PROCESSING UNIT
112
NETWORK SETTING DATA GENERATION UNIT
130
TO OPERATION CONTROLLER
TO MEMORY CARD
TO DVD
TO INTERNET
AUTHENTICATION UNIT
107
MAIN CONTROL UNIT
108
MAIN STORAGE UNIT
110
LARGE-CAPACITY STORAGE UNIT
111
FRAME BUFFER
106
REGISTER UNIT
109
GRAPHIC CONTROL UNIT
113
GRAPHIC STORAGE UNIT
114
VRAM
115
VIDEO SIGNAL GENERATION UNIT
116
AUDIO SIGNAL GENERATION UNIT
117
TO MONITOR
TO SPEAKER

FIG.18

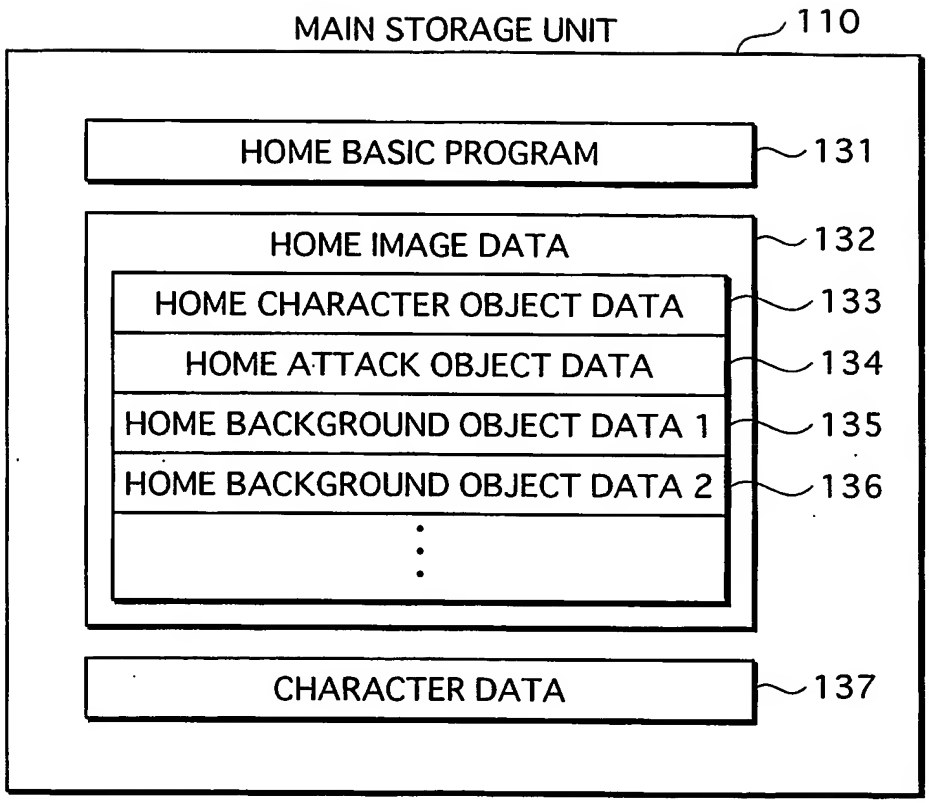

MAIN STORAGE UNIT
110
HOME BASIC PROGRAM
131
HOME IMAGE DATA
132
HOME CHARACTER OBJECT DATA
133
HOME ATTACK OBJECT DATA
134
HOME BACKGROUND OBJECT DATA 1
135
HOME BACKGROUND OBJECT DATA 2
136
CHARACTER DATA
137

FIG.19

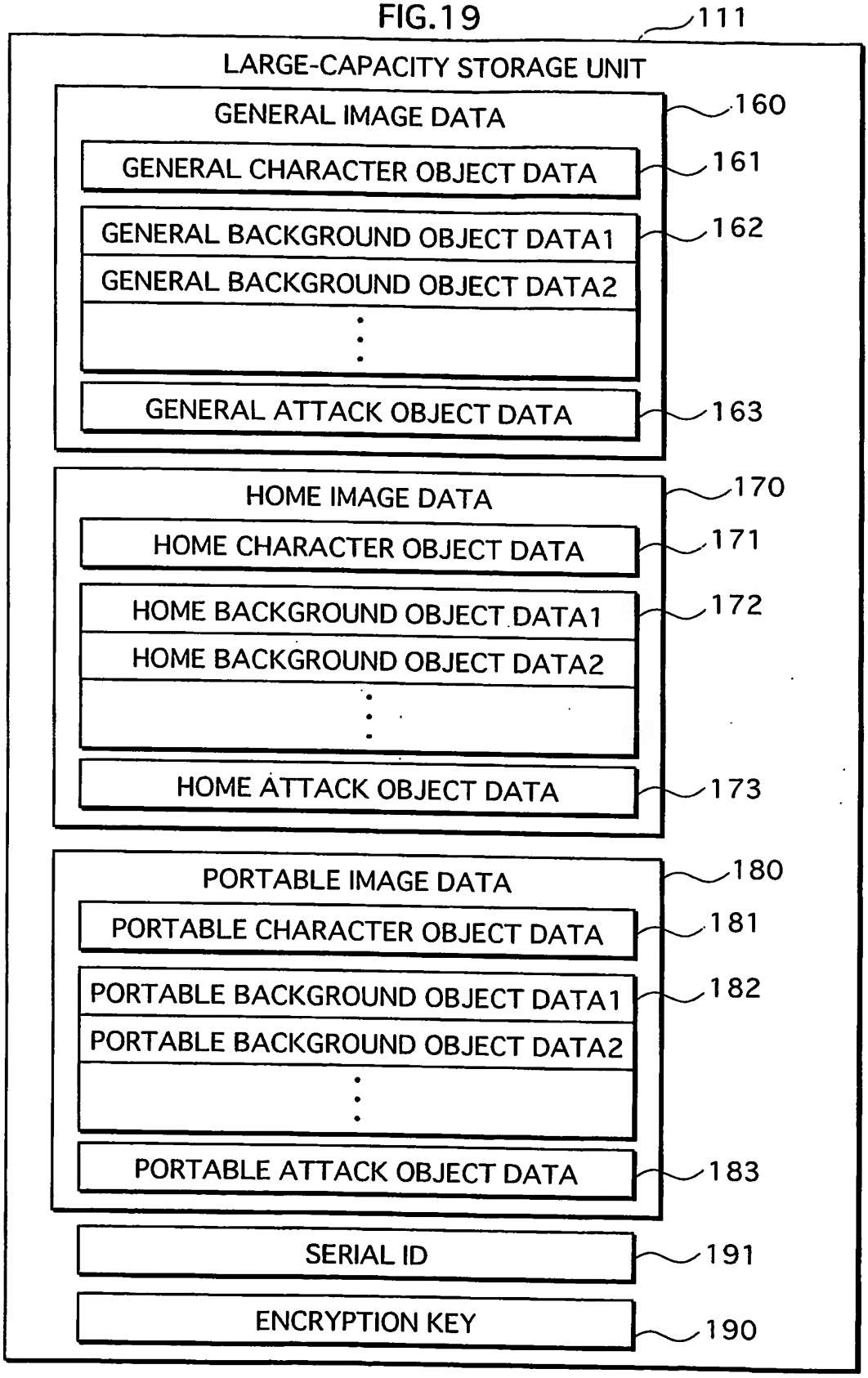

111
LARGE-CAPACITY STORAGE UNIT
GENERAL IMAGE DATA
160
GENERAL CHARACTER OBJECT DATA
161
GENERAL BACKGROUND OBJECT DATA1
GENERAL BACKGROUND OBJECT DATA2
162
GENERAL ATTACK OBJECT DATA
163
HOME IMAGE DATA
170
HOME CHARACTER OBJECT DATA
171
HOME BACKGROUND OBJECT DATA1
HOME BACKGROUND OBJECT DATA2
172
HOME ATTACK OBJECT DATA
173
PORTABLE IMAGE DATA
180
PORTABLE CHARACTER OBJECT DATA
181
PORTABLE BACKGROUND OBJECT DATA1
PORTABLE BACKGROUND OBJECT DATA2
182
PORTABLE ATTACK OBJECT DATA
183
SERIAL ID
191
ENCRYPTION KEY
190

FIG.20

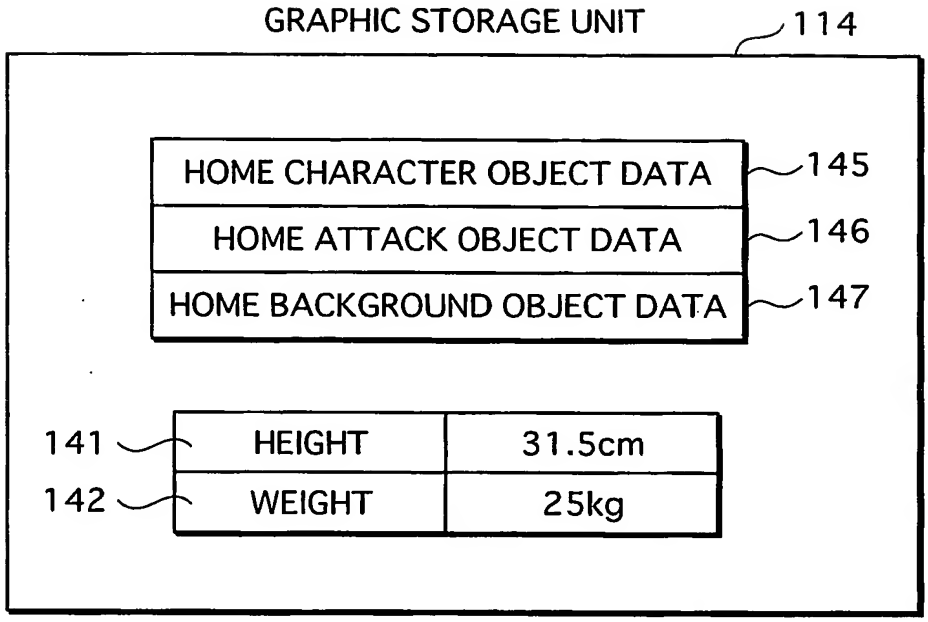

GRAPHIC STORAGE UNIT
114
HOME CHARACTER OBJECT DATA
145
HOME ATTACK OBJECT DATA
146
HOME BACKGROUND OBJECT DATA
147
141
HEIGHT
31.5cm
142
WEIGHT
25kg

FIG.21

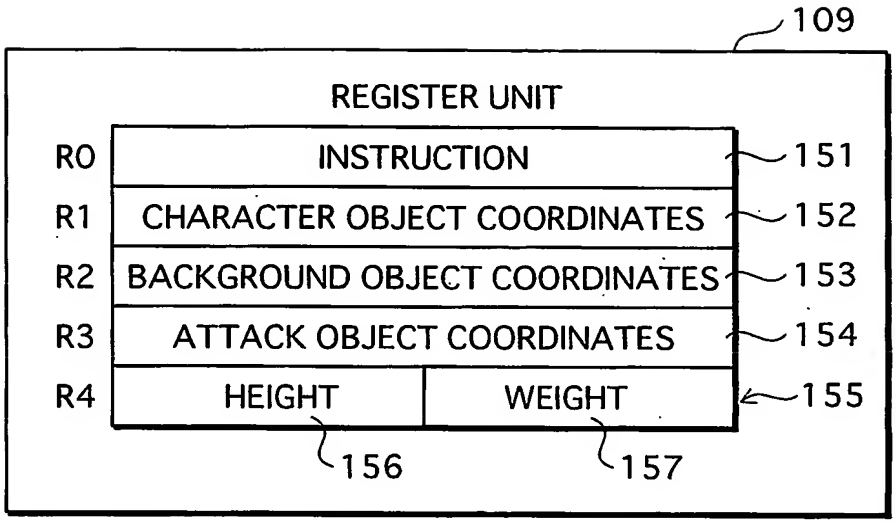

109
REGISTER UNIT
R0
INSTRUCTION
151
R1
CHARACTER OBJECT COORDINATES
152
R2
BACKGROUND OBJECT COORDINATES
153
R3
ATTACK OBJECT COORDINATES
154
R4
HEIGHT
WEIGHT
155
156
157

FIG.22

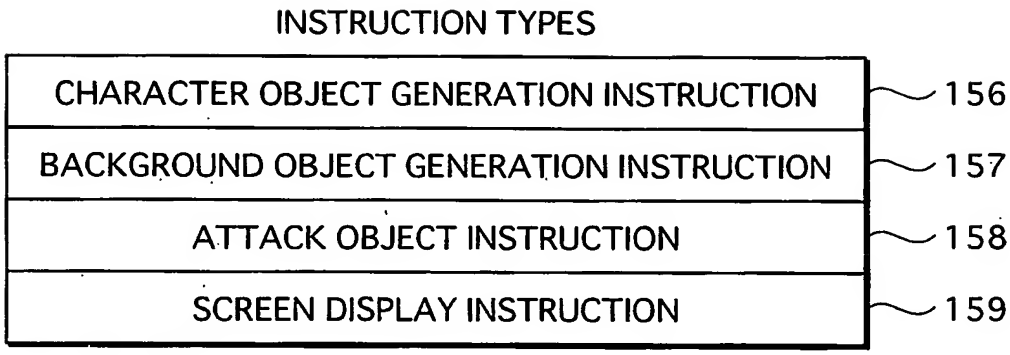

INSTRUCTION TYPES
CHARACTER OBJECT GENERATION INSTRUCTION
156
BACKGROUND OBJECT GENERATION INSTRUCTION
157
ATTACK OBJECT INSTRUCTION
158
SCREEN DISPLAY INSTRUCTION
159

FIG.23

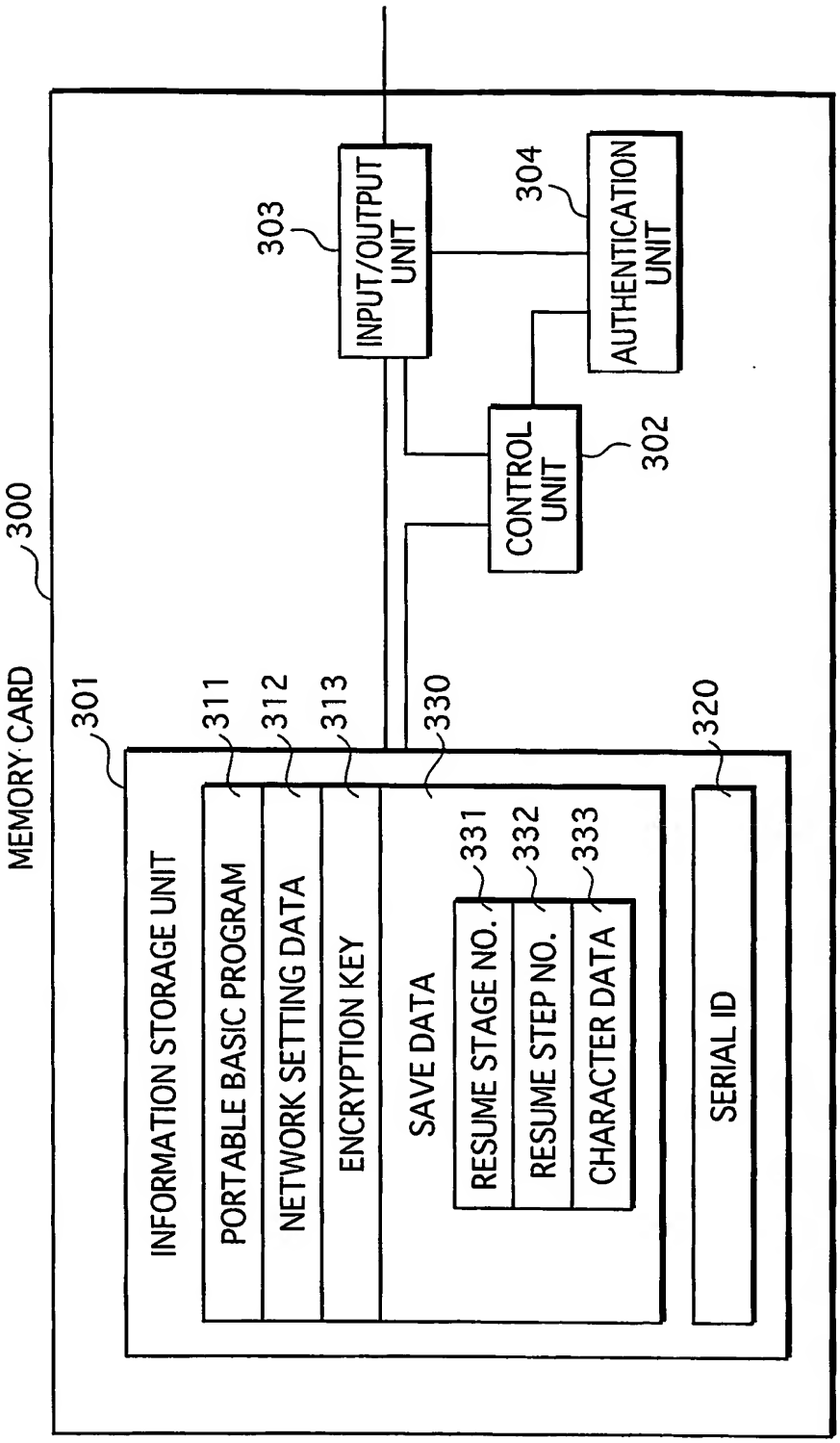

MEMORY CARD
300
301
INFORMATION STORAGE UNIT
311
PORTABLE BASIC PROGRAM
312
NETWORK SETTING DATA
313
ENCRYPTION KEY
330
SAVE DATA
331
RESUME STAGE NO.
332
RESUME STEP NO.
333
CHARACTER DATA
320
SERIAL ID
303
INPUT/OUTPUT UNIT
304
AUTHENTICATION UNIT
302
CONTROL UNIT

FIG.24

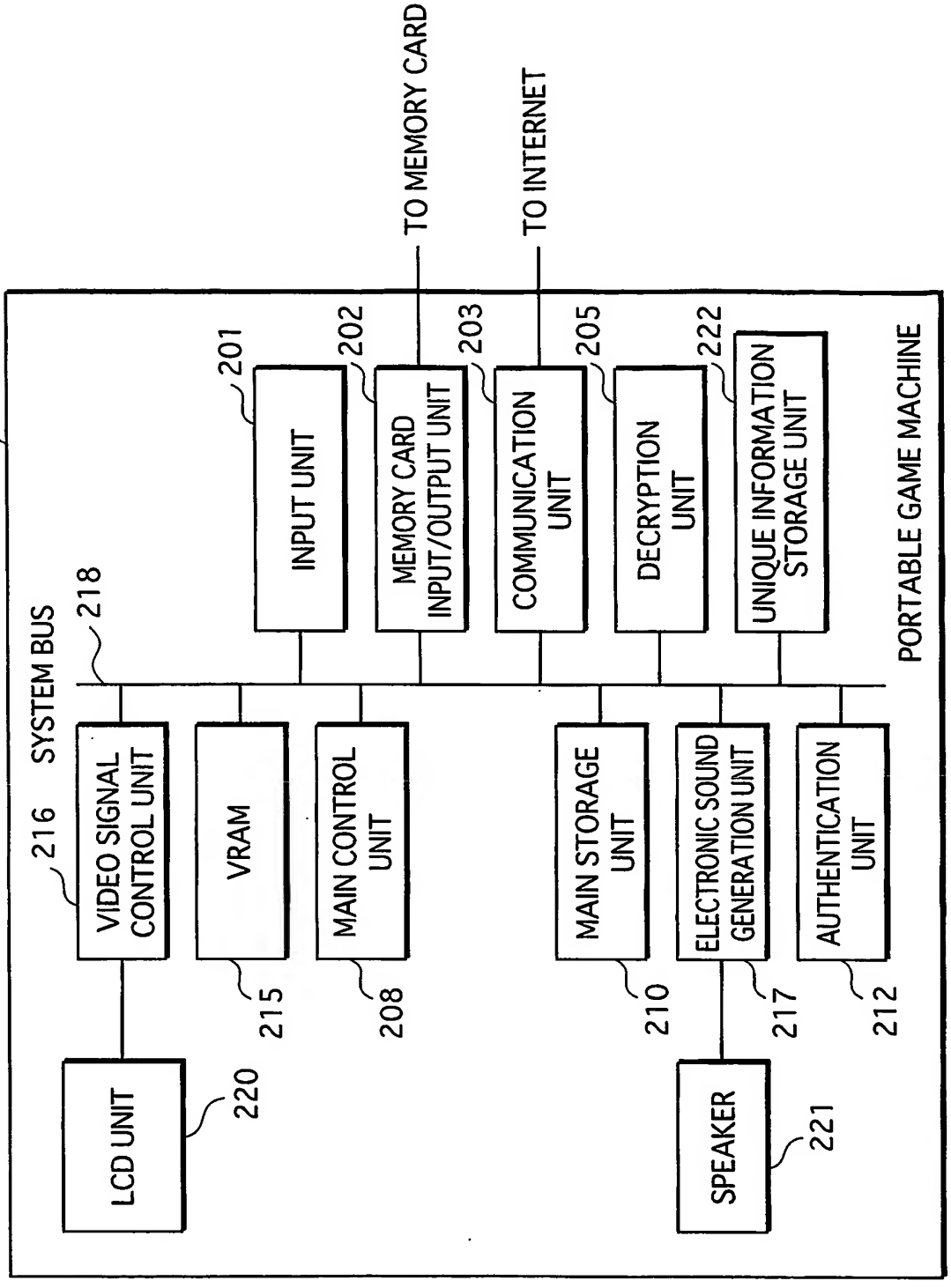

200
PORTABLE GAME MACHINE
TO MEMORY CARD
TO INTERNET
SYSTEM BUS
218
INPUT UNIT
201
MEMORY CARD INPUT/OUTPUT UNIT
202
COMMUNICATION UNIT
203
DECRYPTION UNIT
205
UNIQUE INFORMATION STORAGE UNIT
222
VIDEO SIGNAL CONTROL UNIT
216
VRAM
215
MAIN CONTROL UNIT
208
MAIN STORAGE UNIT
210
ELECTRONIC SOUND GENERATION UNIT
217
AUTHENTICATION UNIT
212
LCD UNIT
220
SPEAKER
221

FIG.25

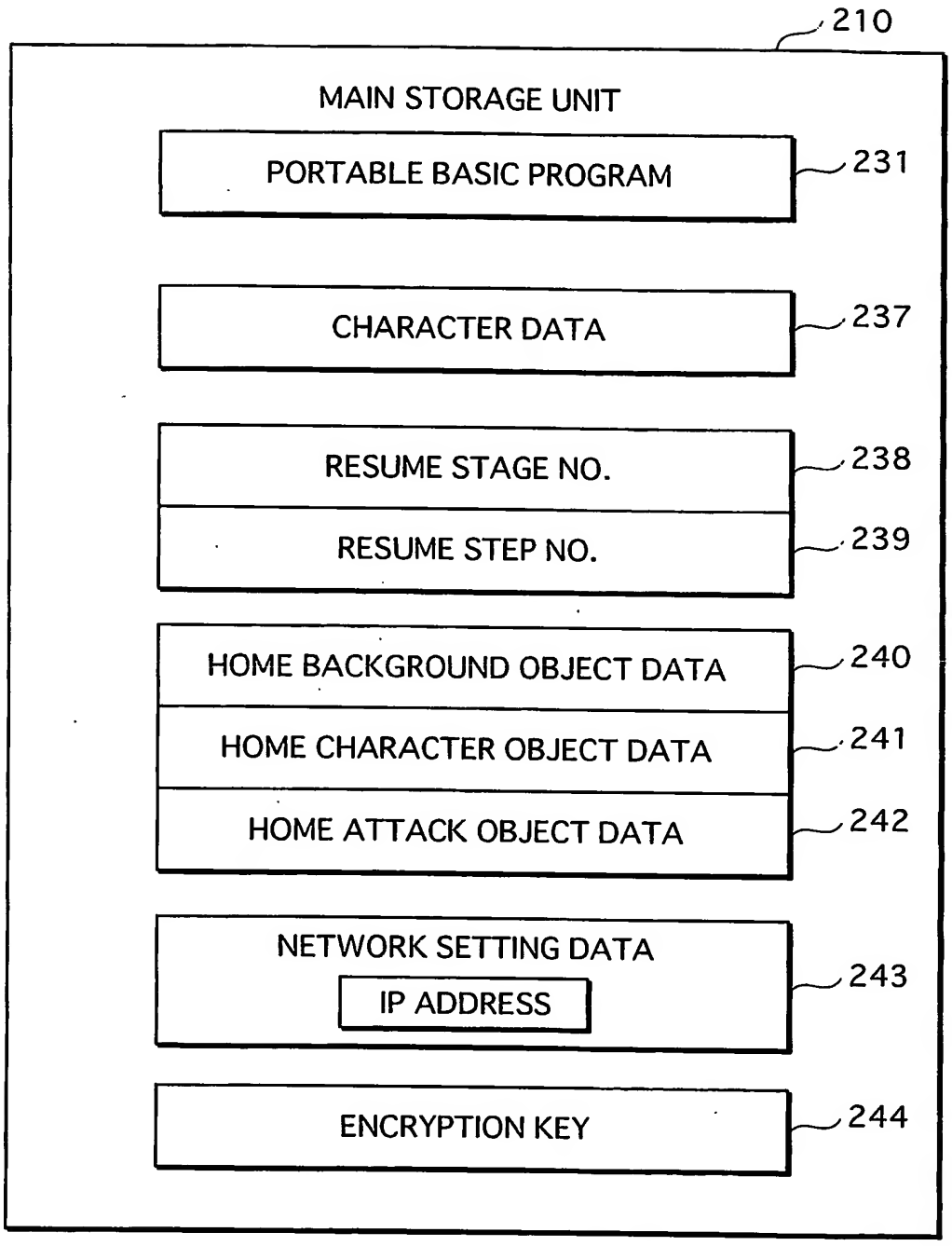

210
MAIN STORAGE UNIT
PORTABLE BASIC PROGRAM
231
CHARACTER DATA
237
RESUME STAGE NO.
238
RESUME STEP NO.
239
HOME BACKGROUND OBJECT DATA
240
HOME CHARACTER OBJECT DATA
241
HOME ATTACK OBJECT DATA
242
NETWORK SETTING DATA
IP ADDRESS
243
ENCRYPTION KEY
244

FIG.26

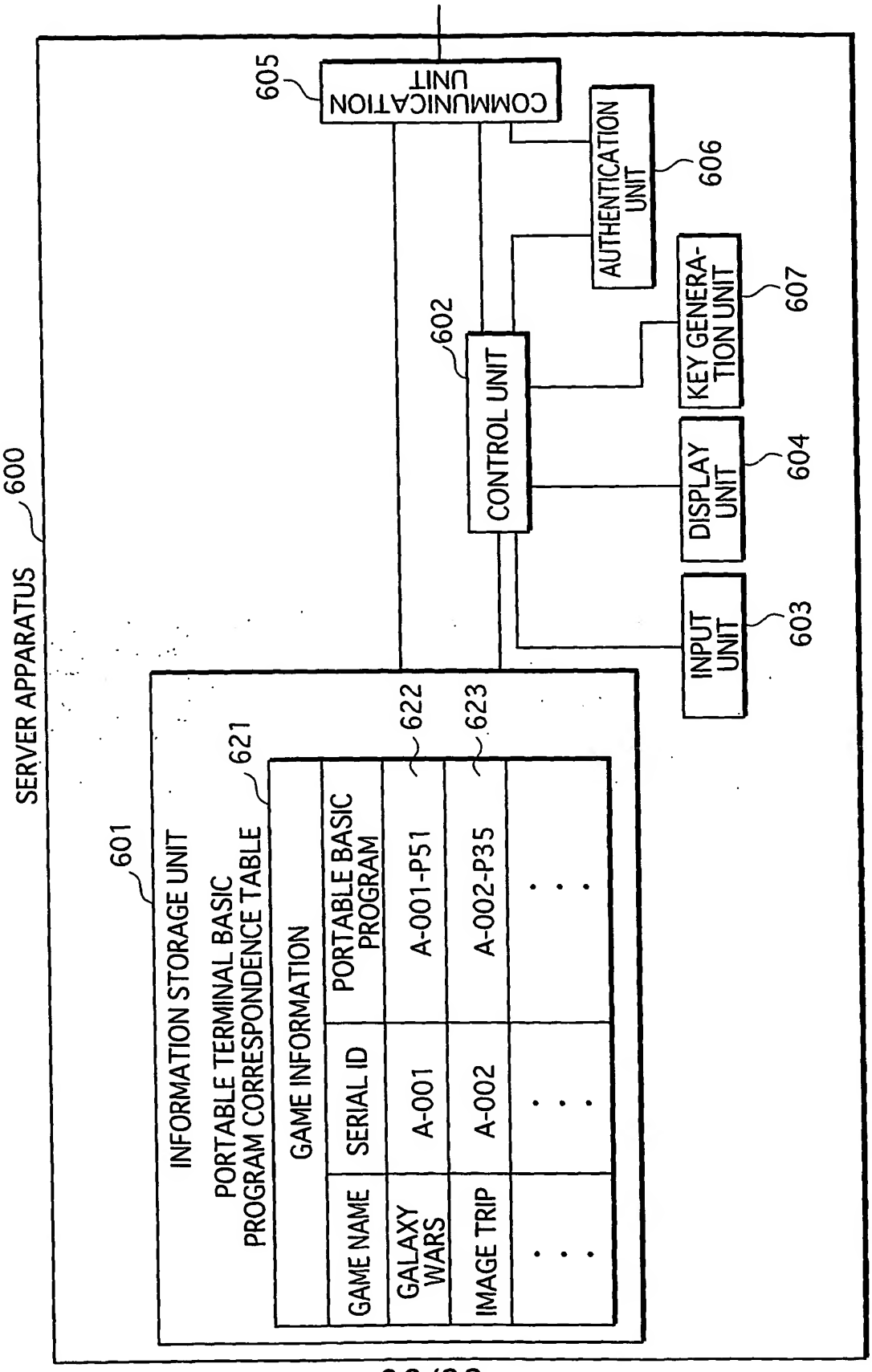

SERVER APPARATUS
600
COMMUNICATION UNIT
605
AUTHENTICATION UNIT
606
KEY GENERATION UNIT
607
CONTROL UNIT
602
DISPLAY UNIT
604
INPUT UNIT
603
INFORMATION STORAGE UNIT
601
PORTABLE TERMINAL BASIC PROGRAM CORRESPONDENCE TABLE
621
GAME INFORMATION
GAME NAME
SERIAL ID
PORTABLE BASIC PROGRAM
622
623
GALAXY WARS
A-001
A-001-P51
IMAGE TRIP
A-002
A-002-P35

FIG.27

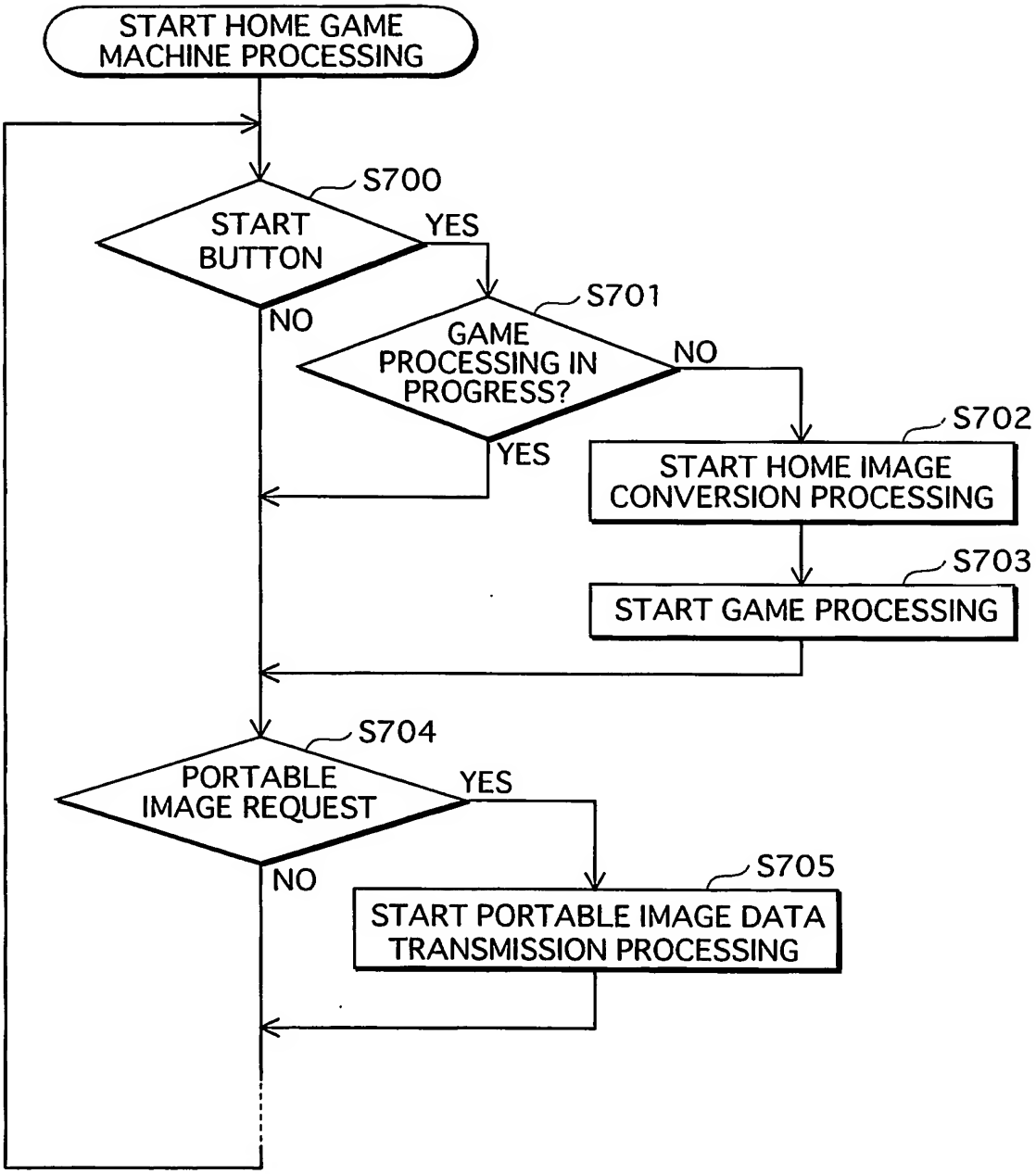

START HOME GAME MACHINE PROCESSING
S700
START BUTTON
YES
NO
S701
GAME PROCESSING IN PROGRESS?
NO
YES
S702
START HOME IMAGE CONVERSION PROCESSING
S703
START GAME PROCESSING
S704
PORTABLE IMAGE REQUEST
YES
NO
S705
START PORTABLE IMAGE DATA TRANSMISSION PROCESSING

FIG.28

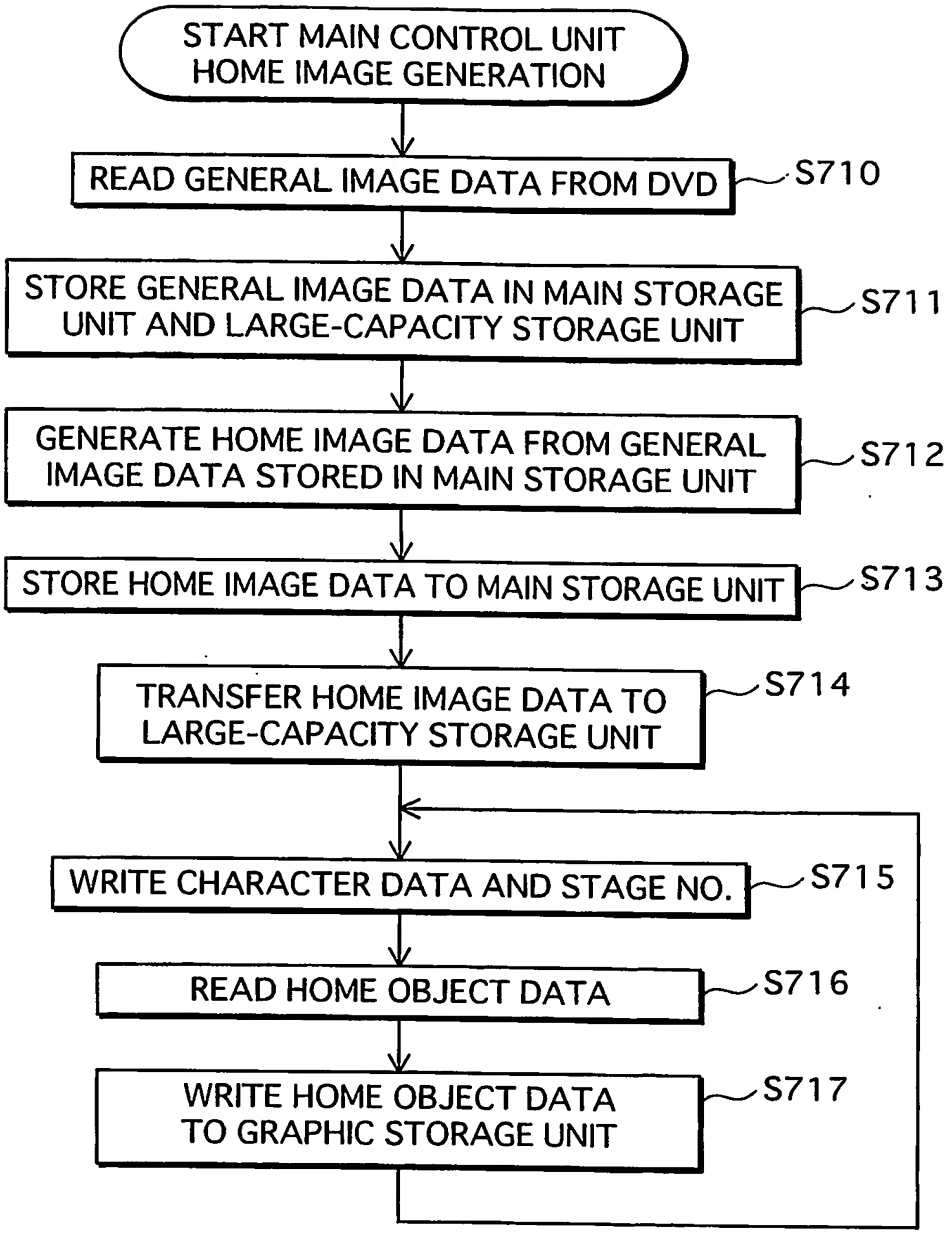

START MAIN CONTROL UNIT HOME IMAGE GENERATION
READ GENERAL IMAGE DATA FROM DVD
S710
STORE GENERAL IMAGE DATA IN MAIN STORAGE UNIT AND LARGE-CAPACITY STORAGE UNIT
S711
GENERATE HOME IMAGE DATA FROM GENERAL IMAGE DATA STORED IN MAIN STORAGE UNIT
S712
STORE HOME IMAGE DATA TO MAIN STORAGE UNIT
S713
TRANSFER HOME IMAGE DATA TO LARGE-CAPACITY STORAGE UNIT
S714
WRITE CHARACTER DATA AND STAGE NO.
S715
READ HOME OBJECT DATA
S716
WRITE HOME OBJECT DATA TO GRAPHIC STORAGE UNIT
S717

FIG.29

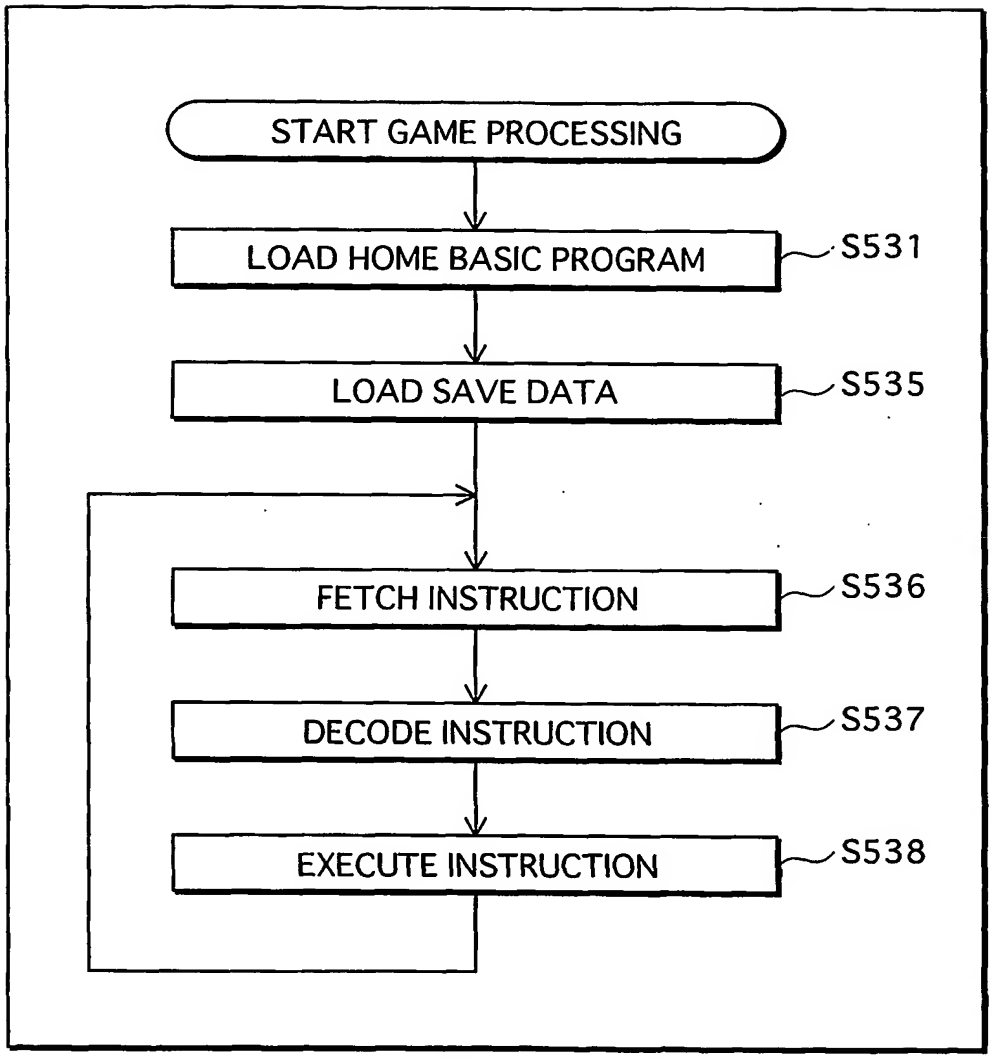

START GAME PROCESSING
LOAD HOME BASIC PROGRAM
S531
LOAD SAVE DATA
S535
FETCH INSTRUCTION
S536
DECODE INSTRUCTION
S537
EXECUTE INSTRUCTION
S538

FIG.30

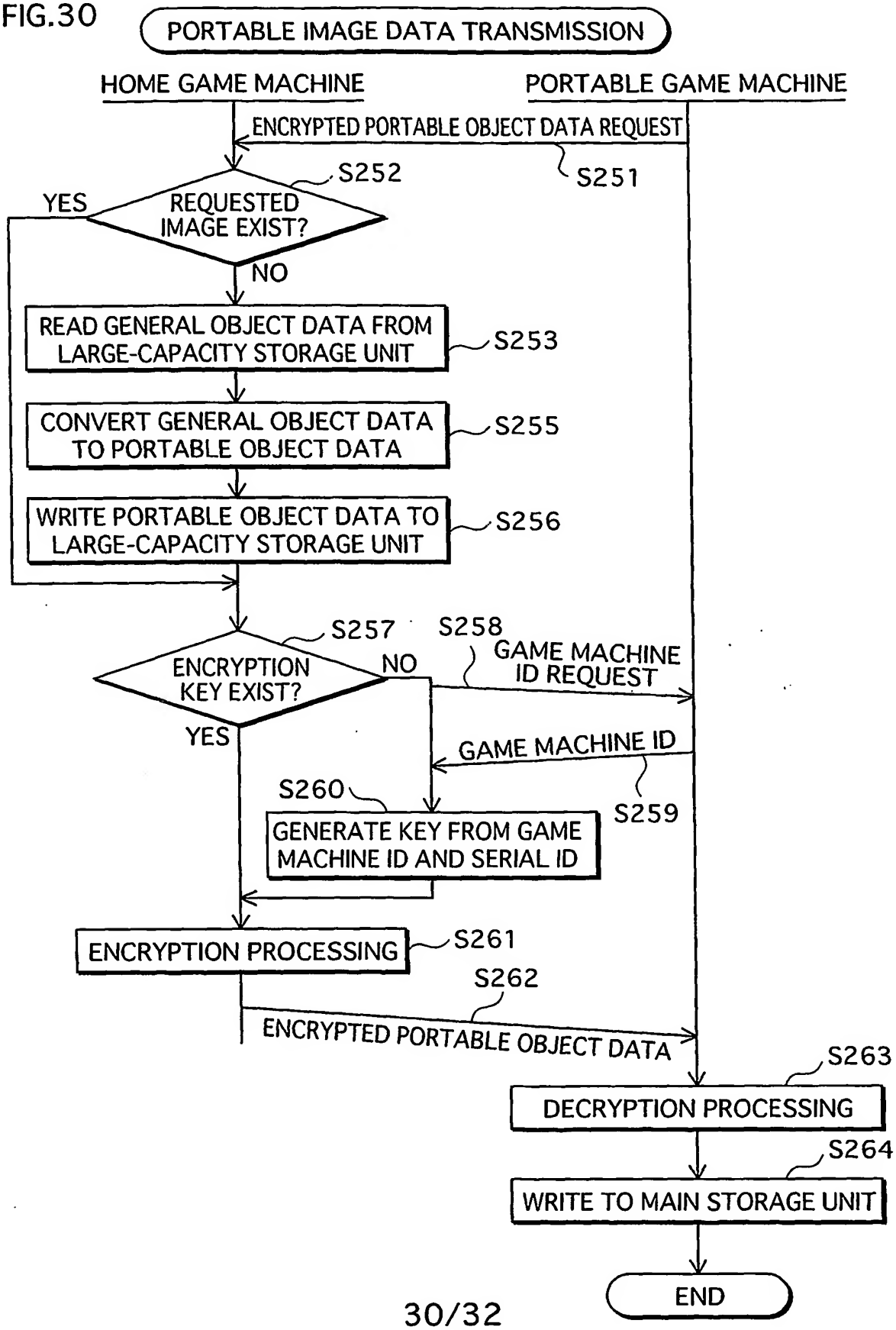

PORTABLE IMAGE DATA TRANSMISSION
HOME GAME MACHINE
PORTABLE GAME MACHINE
ENCRYPTED PORTABLE OBJECT DATA REQUEST
S251
S252
YES
REQUESTED IMAGE EXIST?
NO
READ GENERAL OBJECT DATA FROM LARGE-CAPACITY STORAGE UNIT
S253
CONVERT GENERAL OBJECT DATA TO PORTABLE OBJECT DATA
S255
WRITE PORTABLE OBJECT DATA TO LARGE-CAPACITY STORAGE UNIT
S256
S257
ENCRYPTION KEY EXIST?
NO
S258
GAME MACHINE ID REQUEST
YES
GAME MACHINE ID
S259
S260
GENERATE KEY FROM GAME MACHINE ID AND SERIAL ID
ENCRYPTION PROCESSING
S261
S262
ENCRYPTED PORTABLE OBJECT DATA
S263
DECRYPTION PROCESSING
S264
WRITE TO MAIN STORAGE UNIT
END

FIG.31

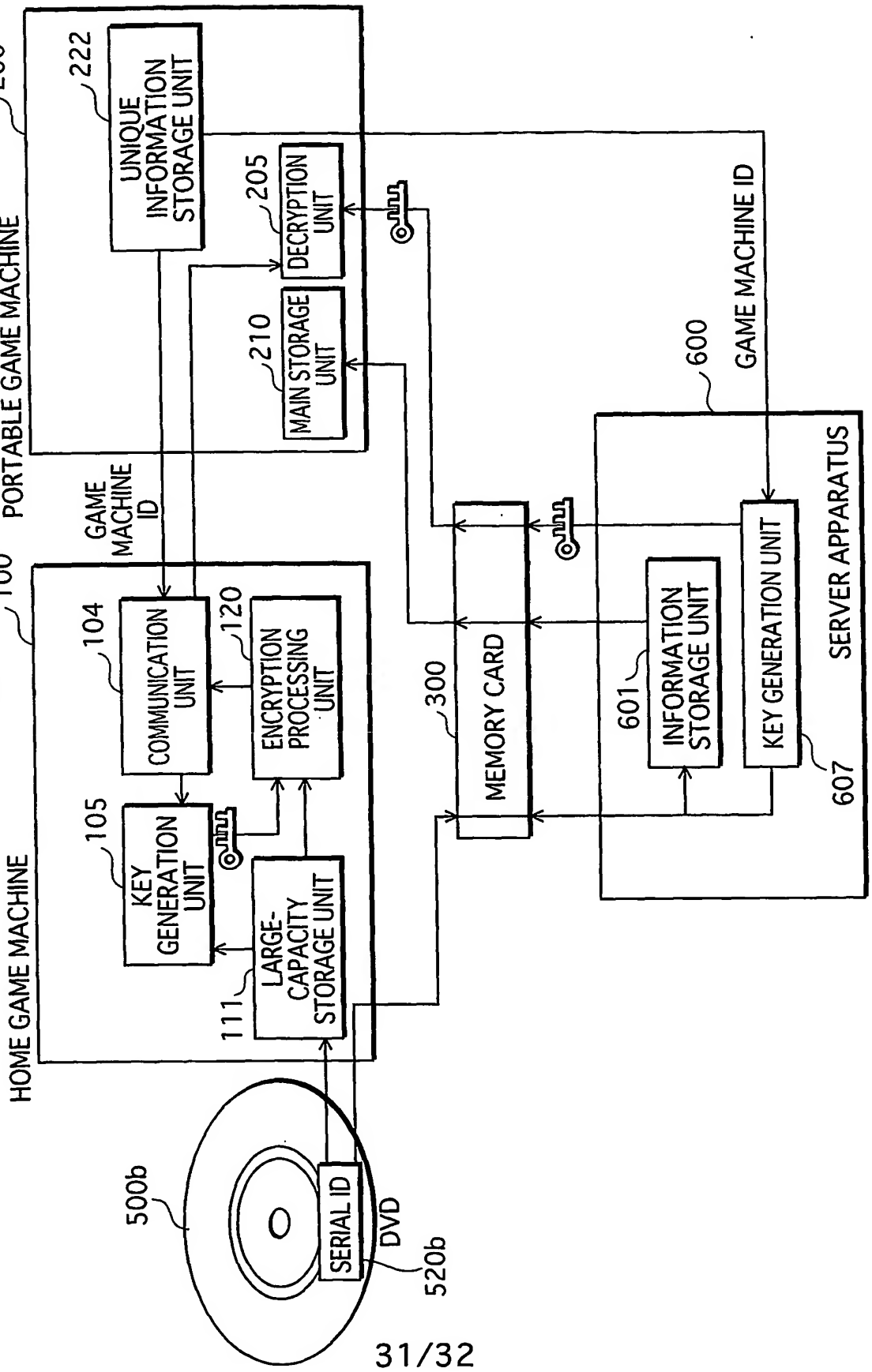
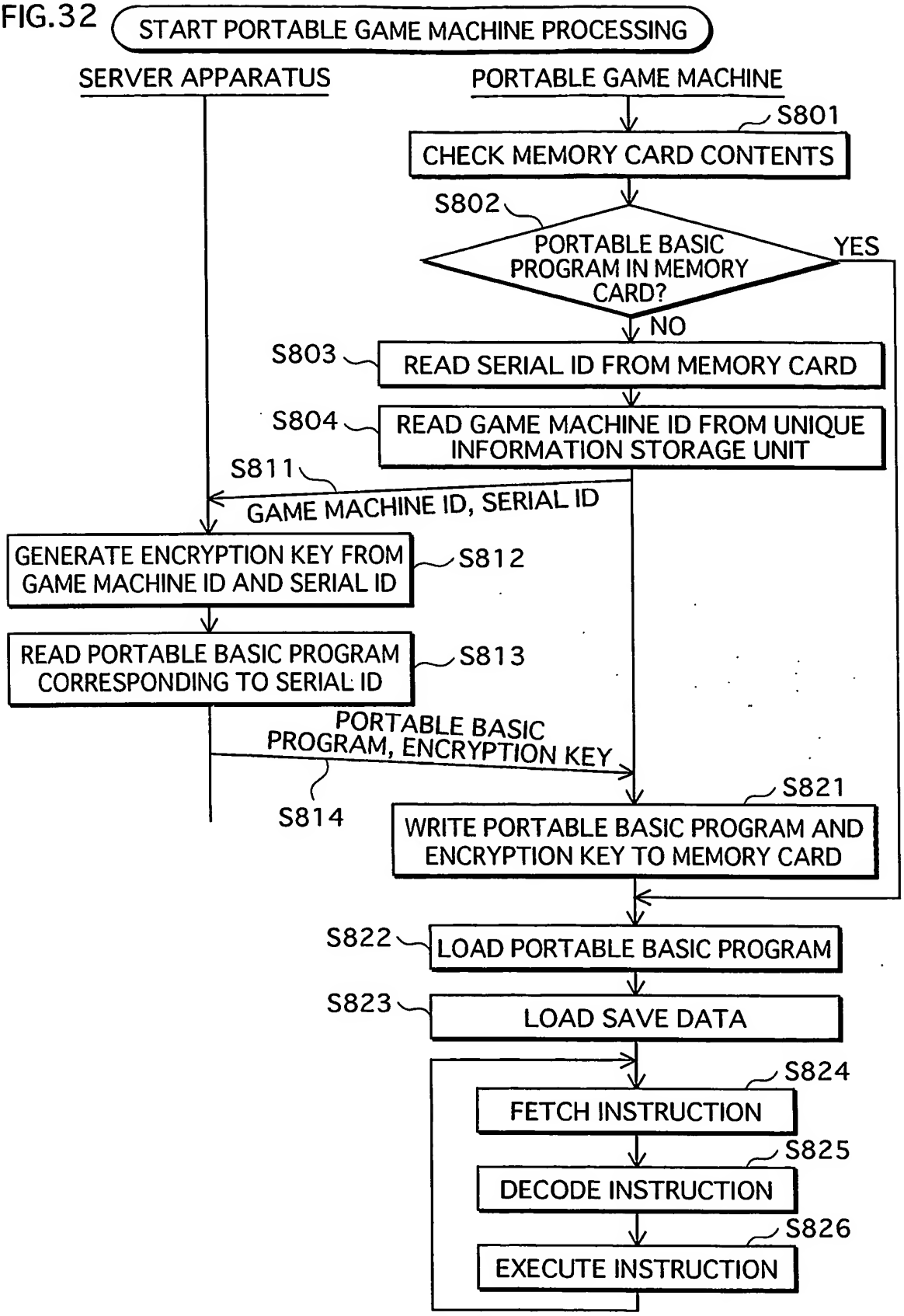

200
PORTABLE GAME MACHINE
222
UNIQUE INFORMATION STORAGE UNIT
205
DECRYPTION UNIT
210
MAIN STORAGE UNIT
GAME MACHINE ID
100
HOME GAME MACHINE
104
COMMUNICATION UNIT
120
ENCRYPTION PROCESSING UNIT
105
KEY GENERATION UNIT
111
LARGE-CAPACITY STORAGE UNIT
300
MEMORY CARD
600
GAME MACHINE ID
601
INFORMATION STORAGE UNIT
KEY GENERATION UNIT
607
SERVER APPARATUS
500b
SERIAL ID
DVD
520b

FIG.32


START PORTABLE GAME MACHINE PROCESSING
SERVER APPARATUS
PORTABLE GAME MACHINE
S801
CHECK MEMORY CARD CONTENTS
S802
PORTABLE BASIC PROGRAM IN MEMORY CARD?
YES
NO
S803
READ SERIAL ID FROM MEMORY CARD
S804
READ GAME MACHINE ID FROM UNIQUE INFORMATION STORAGE UNIT
S811
GAME MACHINE ID, SERIAL ID
GENERATE ENCRYPTION KEY FROM GAME MACHINE ID AND SERIAL ID
S812
READ PORTABLE BASIC PROGRAM CORRESPONDING TO SERIAL ID
S813
PORTABLE BASIC PROGRAM, ENCRYPTION KEY
S814
S821
WRITE PORTABLE BASIC PROGRAM AND ENCRYPTION KEY TO MEMORY CARD
S822
LOAD PORTABLE BASIC PROGRAM
S823
LOAD SAVE DATA
S824
FETCH INSTRUCTION
S825
DECODE INSTRUCTION
S826
EXECUTE INSTRUCTION